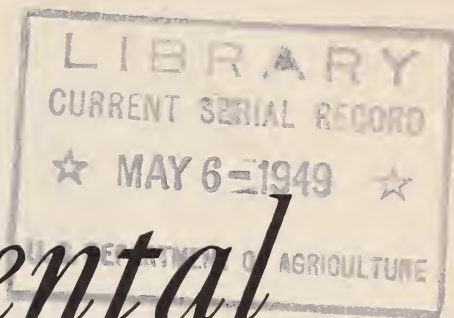


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Some
Ornamental
Vines
for the Tropics



Circular No. 31
Federal Experiment Station in Puerto Rico
U. S. DEPARTMENT OF AGRICULTURE

FEDERAL EXPERIMENT STATION IN PUERTO RICO
MAYAGUEZ, PUERTO RICO

Administered by the Office of Experiment Stations
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United States Department of Agriculture

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COVER ILLUSTRATION.—The climbing fig, *Ficus pumila*, produces two kinds of leaves. The large leaves appear when the fruit is produced.

¹ In cooperation with the Government of Puerto Rico.

FEDERAL EXPERIMENT STATION IN PUERTO RICO

of the

UNITED STATES DEPARTMENT OF AGRICULTURE

MAYAGUEZ, PUERTO RICO

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SOME ORNAMENTAL VINES FOR THE TROPICS

By EDWARD P. HUME, *horticulturist*

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INTRODUCTION

One of the major projects of the Federal Experiment Station in Mayagüez, Puerto Rico, has been the introduction and testing of tropical plants from many parts of the world. Those which have grown successfully and proved useful have been made available for distribution throughout the island and to many countries. It is the purpose of this circular to make available the information on vines gained through the more than 40 years of this project.

It is hoped that similar publications will cover all the plants in the collection. Other vines growing frequently in Puerto Rico are included; but many vines, particularly some wild species, are excluded, as shown below. No attempt has been made to include descriptions of other worth-while tropical vines.

Although this circular is based on vine performance in Puerto Rico most of the vines will be adapted to other parts of the world having a similar climate and even to the extreme southern part of the United States, where frosts are seldom experienced.

Some vines of possible landscape value not included in the descriptive list (p. 97) are given below.

1. Not sufficiently tested:

Dolichandrone stipulata (Wall.) Benth. & Hook.
Luehea divaricata Mart.
Passiflora laurifolia L.
Paullinia fuscescens H. B. K.
Philodendron radiatum Schott.
Solandra guttata Don.
Solanum seafortianum Andr.
Forsteronia corymbosa (Jacq.) G. F. W. Meyer.

2. Too vigorous—will cover surrounding plants unless frequently pruned:

Clitoria racemosa G. Don.
Entada sudanica Schweinf.
Ipomoea, many native or naturalized species.
Cissus sicyoides Linn.

3. Too susceptible to insects or diseases for home use:

Centrosema plumieri (Turp.) Benth.
Pachyrhizus erosus (L.) Urban.

4. Weak growing—vines do not usually grow well enough to be effective under Mayaguez conditions:

Clematis paniculata Thunb.
Clematis recta L.
Momordica charantia L.
Momordica balsamina L.

5. More nearly shrubs than vines:

Holmskioldia sanguinea Retz.
Brownea grandiceps Jacq.
Clitoria racemosa G. Don.

UTILIZATION

Vines can be used in so many ways that they serve a wide variety of purposes. Perhaps their most desirable characteristic is their ability to grow vertically, which enables them to grow in limited spaces and still fulfill their many uses. Screening is one of the most important uses of vines, hiding undesirable views or creating privacy. A front porch or veranda can be "camouflaged" with only a partial vine cover, without cutting off the breeze and at the same time permit the occupants to view the outside without themselves being visible. Vines are frequently used in landscaping to soften undesirable house lines and to tie the house in with its surroundings. A vine function, seldom adequately utilized, is that of covering arbors or other frame supports and shading the area below against the tropical sun, thus creating an outdoor living room useful throughout the day.

Many tropical vines offer a profusion of brightly colored flowers placed where they can be most appreciated, and some blossom almost throughout the year. Material for making flower arrange-

ments can be easily secured from those vines listed as satisfactory for this purpose. Fragrance is an added attraction when certain vines are grown. Others are grown only for the restful green color of their leaves, or as an oddity in color or flower shape. Most vines are day bloomers but a few others bloom only at night. While many vines require full sun tolerating only a light shade, a few are capable of growth under very low light conditions and, therefore, are adapted to indoor use either in pots or tubs or by placing the cut branches in water. A few are grown for the food they produce as well as for their ornamental value.

Many vines are naturally tree climbers. This type is common in the tropical forests, where tree trunks are frequently obscured completely by a network of climbing vines. Among the most satisfactory types for this purpose are the "foliage vines," such as *Philodendron*, *Scindapsus*, *Nephtytis*, and the like, which grow chiefly on the trunk of trees. Others, as the bignonias and closely related species, intermingle with the tree branches and when flowering give the impression that the tree itself is in flower.

There is often some question whether a plant is really a vine or a climbing shrub. The distinction is not easily drawn; for instance the Mandarin hat, *Holmskioldia sanguinea* Retz., will grow over a roof 20 feet high just as the shower of orchids, *Congea tomentosa* Roxb., does; but without support it grows naturally as a shrub and is, therefore, not listed as a vine in this publication. Many of the vines described below will also eventually form low shrubs, but only after successive layers of branches have climbed one over the other or, when pruned constantly, until the lower branches have become thick and woody.

The vines described in this circular are either long-established plants in Puerto Rico or have been included in the vine collection of the Federal Experiment Station at Mayagüez, P. R., for sufficient time to establish their usefulness in ornamental plantings. Many of these plants were secured through the facilities of the United States Department of Agriculture, Bureau of Plant Industry, Soils, and Agricultural Engineering, Division of Plant Introduction and Exploration, and the introductions from this bureau are designated by their P. I. or F. B. I. numbers. Other vines growing wild appear adapted for ornamental purposes but have not been used sufficiently to prove their value.

Since there is no cold season in a truly tropical climate, the question of frost tolerance is not discussed in this circular. But for the same reason, many perennial vines of the temperate regions are not adapted to tropical conditions. Most woody, Temperate Zone plants become dormant in the fall of the year and will not start new growth without a considerable period of cold weather. Consequently they cannot continue satisfactory growth in the Tropics except at high elevations.

SELECTION

No one vine is ideal for all conditions. The vigor, habit of growth, character of the foliage, flower color, profusion, and period of flowering must be considered. Low, short walls or limited areas, for instance, between a wall and nearby walk, should never be planted

with vines having a vigorous growth habit. While they could be held in check by frequent pruning, the effort involved would be unjustified and the resulting appearance of the plant would not be desirable. Plants that climb by twisting stems or leaves should never be planted to grow on a solid wall unless given special support. Some types tend to grow at the top while dropping their lower leaves, or maintain a sparse foliage undesirable for a screen planting.

Table 1 lists some of the characteristics of the various vines discussed as an aid to choosing a type best suited for individual conditions. A few vines, particularly those with aerial roots or holdfasts, growing over old plaster or brick houses may be destructive because of root developments in cracks, and their use under these conditions should be avoided.

TABLE 1.—A comparison of vine characteristics and methods of propagation of the species described

Species	Light ¹	Vigor ²	Climbs by ³	Grown for ⁴	Propagated by ⁵
<i>Adenocalymna alliaceum</i> ----	FS, PS	M	T	B	C, S
<i>Allamanda cathartica</i> -----	FS	M	A	B	C
<i>Allamanda cathartica hendersonii</i> .	FS	V	A	B	C
<i>Allamanda violacea</i> -----	FS	S	A	B	C, G
<i>Anemopaegma chamberlaynii</i>	FS, PS	M, S	T	B	S
<i>Antigonon leptopus</i> -----	FS	M	T	B	S, C, L
<i>Antigonon macrocarpum</i> ----	FS	M	T	B	S, C, L
<i>Aristolochia argyoneura</i> ----	FS	M	A	B, L, N	S, C
<i>Aristolochia elegans</i> -----	FS, PS	M	C	B, L	S
<i>Aristolochia galeata</i> -----	FS, PS	M	C	B, L, N	S
<i>Aristolochia gigantea</i> -----	FS, PS	M	C	B, N	C
<i>Arrabidaea pachycalyx</i> -----	FS	M, V	T, A	B, L	C
<i>Asparagus plumosus</i> -----	FS, DS	M	C, S	L	S
<i>Bauhinia curmanensis</i> -----	FS, PS	M, S	C	B, F	S
<i>Bauhinia galpini</i> -----	FS	V	C	B	S
<i>Beaumontia grandiflora</i> -----	FS, PS	M	A	B, L	RC
<i>Bougainvillea</i> -----	FS	V, M	S, A	B	C
<i>Calonyction aculeatum</i> -----	FS, PS	V, M	C	B, F	S
<i>Cissus rhombifolia</i> -----	PS, DS	S	C	L	C
<i>Clerodendron thomsonae</i> -----	FS	M	C	B, L	C
<i>Clitoria ternatea</i> -----	FS	M	C	B, L	S
<i>Combretum grandiflorum</i> -----	FS	V, M	A, C	B, L	S
<i>Combretum</i> sp.-----	FS	V, M	A, C	B, S	C
<i>Congea tomentosa</i> -----	FS	V	A, C	B	C
<i>Cryptostegia madagascariensis</i> .	FS	V, M	A	B, L	S, C
<i>Cydista aequinoctialis</i> -----	FS	V, M	T	B	C
<i>Ficus pumila</i> -----	FS, PS	M	H	L	C
<i>Hylocereus trigonus</i> -----	FS, PS	V	H	B, F	C
<i>Jasminum azoricum</i> -----	FS	S	C	B, F	C
<i>Jasminum dichotomum</i> -----	FS, PS	M, V	C, A	B, F	C, S

¹ FS=full sun; PS=partial shade; DS=deep shade.

² VV=very vigorous; V=vigorous; M=medium; S=slow.

³ T=tendrils; H=holdfasts or aerial roots; C=curling stems or leaf stems; S=spines; A=arching.

⁴ B=blossom color; F=fragrance; L=leaves; S=seeds; F=fruit; N=novelty

⁵ G=grafting; S=seeds; C=cuttings; L=layer; D=division; RC=root cuttings.

TABLE 1.—A comparison of vine characteristics and methods of propagation of the species described—Continued

Species	Light	Vigor	Climbs by	Grown for	Propagated by
<i>Jasminum pubescens</i> -----	FS, PS	M	C, A	B, L	C
<i>Lonicera japonica halliana</i> ---	FS, PS	V	C	B, F	C
<i>Monstera deliciosa</i> -----	PS, DS	M, V	H	L, F	C
<i>Nephtytis afzelii</i> -----	PS, DS	M	H	L, B	C
<i>Passiflora edulis</i> -----	FS	M	T	B, F	S
<i>Passiflora foetida</i> -----	FS	M	T	B, F	S
<i>Passiflora quadrangularis</i> ---	FS	M, V	T	B, F	S
<i>Philodendron dubium</i> -----	PS, DS	S	H	L	C
<i>Philodendron giganteum</i> -----	PS, DS	S, M	H	L	C
<i>Philodendron erubescens</i> -----	PS, DS	S, M	H	L	C
<i>Philodendron nechodomi</i> -----	PS, DS	M, V	H	L	C
<i>Piper betle</i> -----	PS, DS	S	H	L	C
<i>Piper nigrum</i> -----	PS, DS	S	H	L	C
<i>Porana paniculata</i> -----	FS, PS	M	A	B, L	C, S
<i>Pyrostegia ignea</i> -----	FS	M, V	T	B	C
<i>Quisqualis indica</i> -----	FS, PS	V	A	B, L	C
<i>Scindapsus aureus</i> -----	PS, DS	M, V	H	L	C
<i>Sechium edule</i> -----	FS, PS	V	T	L, F	S
<i>Securidaca diversifolia</i> -----	FS, PS	M	C	B, L	S
<i>Senecio confusus</i> -----	FS	M	C	B	S, L
<i>Solandra grandiflora</i> -----	FS	M	A	B	C (S)
<i>Solanum jasminoides</i> -----	FS	V	A, C	B	C
<i>Stephanotis floribunda</i> -----	FS, PS	M	C	B, L, F	S, C
<i>Strophanthus sarmentosus</i> ---	FS, PS	M, V	A	B, L, N	C
<i>Syngonium auritum</i> -----	PS, DS	S	H	L	C
<i>Tecomaria capensis</i> -----	FS	M	A	B	C (S)
<i>Thunbergia alata</i> -----	FS, PS	M	C	B	S
<i>Thunbergia fragrans</i> -----	FS, PS	M, V	C	B	S
<i>Thunbergia grandiflora</i> -----	FS, PS	M, V	C	B, L	C
<i>Uvaria lancifolia</i> -----	FS	VV	A	B, L, F	S
<i>Vanilla</i> -----	PS	M	H	B, L, N	C

PROPAGATION

It is usually desirable to secure established plants of the vines selected for planting from nurserymen whenever possible as the chances of failure in propagation and growth by inexperienced people are rather high. The plants are usually in better shape as a result of regular attention, and considerable time, labor, and effort are saved. However, if the home grower is willing to make the effort and devote sufficient care, there is no reason why he cannot obtain satisfactory plants.

In order to secure new plants several methods are employed. The most satisfactory propagation method for each type of vine is given at the end of its description in a later section, but occasionally other methods may also serve. Propagation is divided into two main classes—from seed, and from vegetative parts of the plant. The latter method is used chiefly when seeds are not produced or when the vines do not come true from seed.

Seed.—Seeds can be planted directly where the plants are to be grown, but this method generally entails too much attention. Seed-

ing in flats or pots is usually more desirable. A flat is a shallow box constructed with a wire mesh or wooden slat bottom to insure adequate drainage. A 1-inch layer of coarse material such as gravel or broken pots is placed on the bottom, over which 3 to 4 inches of prepared soil is spread. A good soil usually consists of a mixture of approximately equal parts of sand, topsoil, and an organic matter such as peat moss, well-decayed leaves, or smaller quantities of thoroughly decomposed manure. The soil should be screened or otherwise pulverized prior to planting. When the flats or pots are prepared for seeding the soil should be only sufficiently moist to hold its shape when squeezed in the hand. The soil, especially at the corners, needs firming to avoid excessive settlement after watering. Another medium which has provided desirable for germinating seeds is sphagnum moss, particularly for very small seed and those susceptible to the fungus disease known as "damping off." A label or tag should be placed at the head of each row of seeds to avoid confusion.

Seeds vary in the amount of soil cover required. Planting about twice as deep as the seed diameter is a general rule satisfactory for most plants. The distance allowed between seeds depends on how soon one expects to transplant. Closely spaced seeds must be transplanted earlier. Seeds are often sown too close for their best development, and they soon become spindly. Since it is seldom necessary to have large numbers of vines, it is best to keep the seeds well separated.

Watering is a very important part of seed germination. When seed is in sphagnum moss, additional water is necessary only at long intervals, particularly when the container is covered by glass. Soil mixtures must be watered regularly in sufficient volume to wet the lower layers, but not often enough to cause the seeds to rot. A good method of watering is to set the container in a shallow pan of water just long enough for the surface to be moistened by the moisture rising through the pores. This insures equal watering of all parts and is required less frequently than the usual surface watering.

The seedlings should be protected from winds or heavy rains. They can be transplanted directly to their permanent location, but for lower mortality and greater convenience it is usually preferable to transplant to pots, or cans with perforated bottoms, until larger and better established. The pots or cans have a small volume of soil and consequently require regular but not too frequent watering. Enough water must be applied to wet all the soil in the can at every watering to encourage root growth and reduce the number of waterings required.

Vegetative.—When seeds are not available or the vines do not come true from seed new plants can usually be established from cuttings by rooting them under favorable conditions. Stem cuttings can usually be made from sections of the stem from close to the tip until it reaches 1 inch or occasionally 1½ inches in diameter. Each cutting should have at least two nodes or joints (the leaf scars indicate the node where leaves have dropped). Leaves, if present, should be removed from all but the top node. The rooting medium is usually washed sand. Other effective media are washed cinders and equal parts of peat and cinders. Expanded mica is a new rooting medium

that has proved useful because of its superior aeration, ease of handling, and absence of disease.

Since the cuttings have no roots at the start, it is necessary, particularly with leafy cuttings, to reduce the amount of water loss as much as possible. The humidity of the air around the cuttings should be maintained at as a high level as possible. Cuttings of certain species must be enclosed to prevent drying. A coldframe, inverted aquarium, bell jars, battery jars, or even wide-mouthed bottles can be used. All cuttings should be given partial shade at first which can be gradually removed as the roots develop. This shade can be supplied by covering a frame over the cuttings with cloth, lath, large leaves, or branches.

The cuttings should be made with a sharp knife. The top of each is cut at a node or joint to prevent a dead stub, which may later develop rot. In placing the cuttings in the media care is necessary to avoid crushing the exposed ends of the water-conducting tubes; yet close contact is also necessary between the water film around the particles of the media and the cuttings. This is accomplished by preparing a hole, or narrow groove, deep enough to bury the cutting about half its length and firming around the cutting by tamping the media, rather than pressing down the cutting itself. If expanded mica is used, the cuttings can be safely pushed into it. Cuttings must be watered frequently. When rooted, they are potted and handled similarly to seedlings. Thick, fleshy stems such as the *Monstera*, *Philodendron*, and vanilla can better be rooted in the place they are to grow. Without removing any leaves, the lower half is deeply covered with semidecomposed leaf litter and watered regularly until established. *Scindapsus* and a few others can be rooted in water.

Some vines can be rooted more easily by layering which is done by partially cutting the stem, burying these sections, and watering regularly until roots are formed. Others develop new shoots below the ground and so are adapted to division of the clump. This method produces few new plants, but they are effective sooner because of their larger size. Other methods and more detailed descriptions are available in books on plant propagation.¹

TRANSPLANTING

When seedlings or rooted cuttings are transplanted there is considerable loss of roots. The tops should be partially cut back or the leaf number reduced by partial defoliation to compensate for the root injury. The newly set plant needs to be shaded and watered frequently until reestablished. The final location should be chosen with care. Planting too close to the building or under the drip of the eaves should be avoided. The ultimate size of the vine should be kept in mind in planting so the plants will not be set too close together. The newly set vines may be cultivated or weeded occasionally until well established. A little fertilizer is often desirable 3 to 4 weeks after planting. Bonemeal, well-rotted manure, or complete fer-

¹ Such as Kains, H. G., and McQueston, L. M., *Propagation of Plants*. Orange Judd., Ed. 2. 555 pp., illus. New York. 1938, and Watkins, J. V., *Propagation of Ornamental Plants*. Fla. Agr. Expt. Sta. Bul. 347, 54 pp., illus. 1940.

tilizer with most of the nitrogen in organic form will be satisfactory. Additional applications depend on the nature and available amount of plant food in the soil, and the extent of vigor desired. If the vine roots are covered with sod, the grass roots usually intercept a major part of the fertilizer applied on the surface; so enough fertilizer is needed under these conditions to supply both grass and vine.

PRUNING

Most vines should be pruned occasionally, particularly if grown in limited areas. This may require cutting to the ground if there is an accumulation of dead wood or lack of sufficient foliage at the base, or merely cutting off extra vigorous branches. Shearing vines is usually not as successful as with plants adapted to hedge growth.

In nature, especially in tropical forests, insects and reptiles find the dense mass of vines which clothe the trunks of large trees a favorable abode. It is therefore natural even under conditions of cultivation that both insects and reptiles, although not necessarily poisonous, should occasionally nest in vines. Since they prefer a large bulk of stems and leaves, they can be discouraged, if necessary, by pruning. This may consist of cutting all branches back to the ground or leaving one or two stems to carry on their function in the landscape. Less drastic pruning such as the careful removal of main stems and dead wood from time to time may also be effective. Vine supports should be located away from walls.

If insects persist they can be controlled by sprays, dusts, or other forms of insecticide.

SUPPORT

The nature of vine growth indicates the necessity of some support. Vines differ in their mode of climbing and provision must be made to permit the climbing mechanism to be effective. For most vines which climb by tendrils, twisting stems, or leaf stems, small-dimensional supports are necessary and if horizontal, they must not be too far apart. A few vines are adapted to holding directly on wood, brick, or stone walls. (See p. 4.) The simplest form of support consists of vertical strings or wires which can easily be attached to roofs or eaves. More elaborate structures such as trellises, arbors, pergolas, and the like are best constructed out of concrete. For tropical conditions wood should be treated against rot and termites in order to serve for several years, preferably set in concrete footings. Species of bamboo resistant to the powder-post beetle are useful for this purpose.

TECHNICAL TERMS

Every effort has been made to eliminate technical terms not generally understood by the average reader. A few common botanical names have been included which could only be replaced by long explanatory clauses or for which no common name is known. A simple definition of each is given below for the benefit of those not familiar with them.

Axil—The upper angle of the stem and leaf stem where some flower stems and tendrils originate.

Blade—The flattened, expanded part of the leaf.

Bract—A structure at the base of leaves or flowers resembling leaves, or colored, like flowers.

Holdfasts—Short modified aerial roots along the stem used to anchor the stem to its support.

Lobe—A section of the leaf blade extending beyond the surrounding tissue.

Node—A section of stem bearing leaves and sometimes tendrils, branches, and flowers.

Petal—One member of the inner whorl of flower parts or corolla surrounding the the sexual organs of the flower, usually brightly colored.

Sepal—One member of the outer whorl or calyx occasionally brightly colored but more often small, green, and inconspicuous.

Tendrils—A slender threadlike organ, simple or branched, originating at the tips of branches, in the leaf axil, or replacing the terminal leaflet in a compound leaf. It curls around any available support to hold the stem and is often dropped when the leaves get older.

NAMES

The English common names and scientific names used are chiefly those listed in Standardized Plant Names. In order to avoid confusion only one English name is listed with each vine description. Other English names are listed in the Index, with the corresponding scientific name. The Spanish names are those in local use and listed in *Catálogo de los Nombres Vulgares y Científicos de Algunas Plantas Puertorriqueñas*, by Otero, Toro, and Otero.

DESCRIPTION OF THE VINES

Adenocalymna alliaceum (Lam.) Miers
"Bejuco de Ajo," "Mata de Ajo" (fig. 1)



FIGURE 1.—The bejuco de ajo, *Adenocalymna alliaceum*, produces large clusters of lavender-blue flowers on short side stems.

A well-established vine in Puerto Rico is the bejuco de ajo, which derives its name from the slight garlic odor of the flowers or crushed leaves. It grows well in sun or partial shade and is apparently not particularly sensitive to soil conditions. It is generally useful as a semiwoody climber with dependable blossoming during most of the year.

The flowers are produced on short side branches each of which carries 6 to 12 flower stalks; each stalk carries 2 to 4 flowers. The individual flowers are 2 inches in diameter and almost as long. When fresh, the petals are deep lavender blue; the interior of the cup white. As the flower ages the colors gradually blend to form a uniform light lavender blue.

The leaves are compound, consisting of two leaflets and a long tendril. The leaflets are produced on short stalks. The sides of the leaflets tend to bend upward from the midvein in the shape of a wide V and the tips to bend slightly in the opposite direction.

Propagation is generally made from seeds if available. Propagation from layers or stem cuttings is also practiced.

Allamanda cathartica L.
Common Allamanda
"Canario," "Cautiva"
(fig. 2, C, a)

This woody vine grows vigorously even in poor soil, in full sun, or semishade. It is grown throughout the island of Puerto Rico. If unsupported and regularly cut back it will produce a shrubby appearance. It has no specialized method of climbing but grows rapidly, arching over any available support. Side shoots branching from the highest point rise a few feet to droop over higher supports. These plants can therefore be used to good advantage over pergolas, summer houses, balustrades, and similar structures having intermittent horizontal support.

The flowers are numerous, deep yellow, $2\frac{1}{2}$ inches in diameter, and about the same length. The flower consists of a slender tube swelling into a narrow cup with five petals spreading from the rim. The interior of the cup is marked with two faint reddish veins at the base of each petal. Flowering branches arise from the leaf axils along the stem; each produces a series of blooms, two flowers usually opening at a time. The leaves are dark green and shiny, usually in whorls of four.

The plant is propagated by cuttings.

Allamanda cathartica var. *hendersonii* Bull
Henderson Allamanda
"Canario Grande," "Amor sin Celos" (fig. 2, A, and C, b)

This variety is superior to the standard form of the species for most purposes because it is more showy and faster growing. Because of its greater vigor, it is sometimes used as a rootstock for other allamandas. It can be utilized for the same purposes as *Allamanda cathartica* and is perhaps better suited for larger areas.

This variety can be distinguished from the normal form of *Allamanda cathartica* by the larger flowers with wider petals and larger

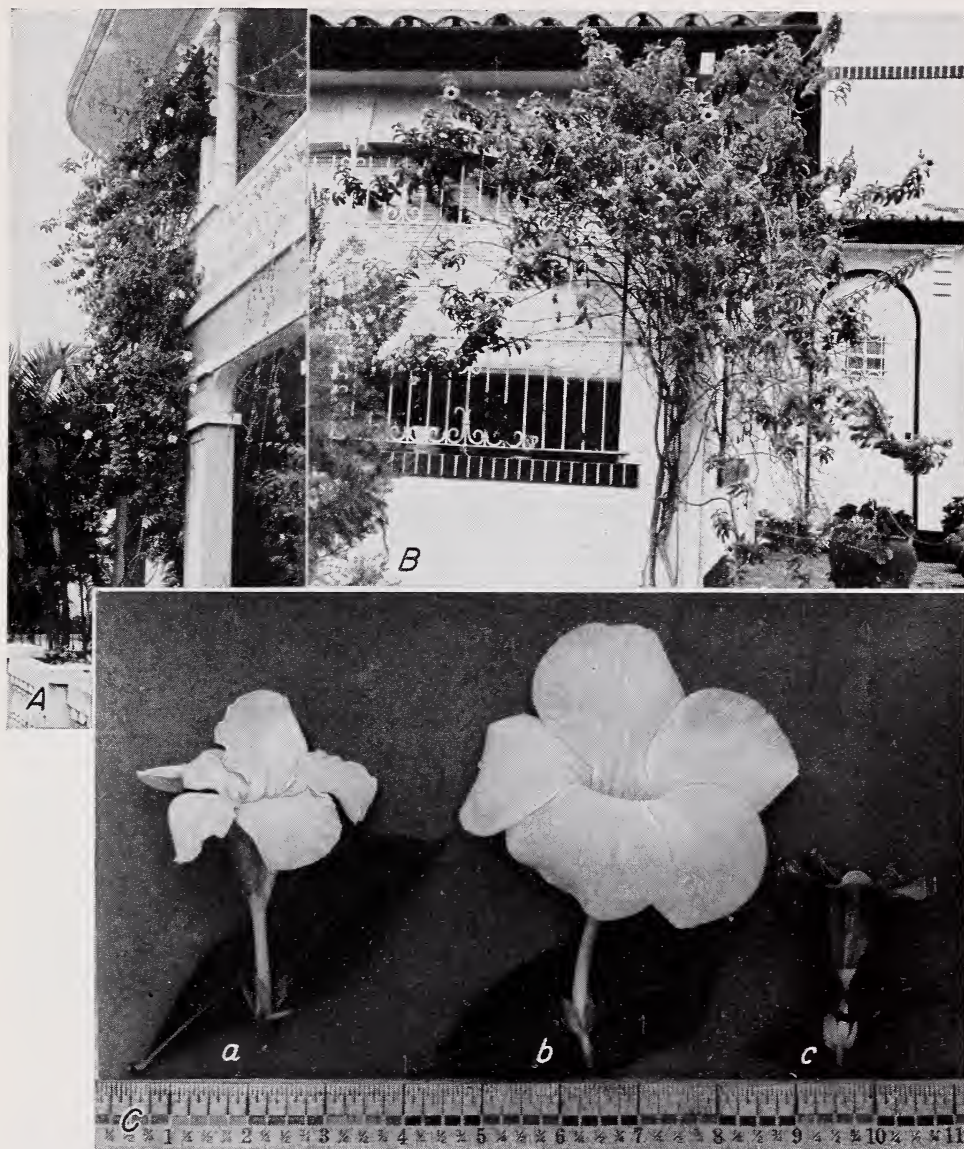


FIGURE 2.—Allamandas grow well and flower freely in sunny areas. *A*, Henderson allamanda screening a second-story porch. *B*, Violet allamanda is a slow grower which can be confined in small spaces. *C*, Flowers and leaves of three types of allamandas: *a*, *Allamanda cathartica*; *b*, *A. cathartica* var. *hendersonii* or Henderson allamanda; and *c*, *A. violacea* or violet allamanda.

cup and by the reddish-purple tinge of the bud. The leaves are also broader and the plant is a more vigorous grower.

Propagation is by cuttings.

Allamanda violacea Gardn.

Violet Allamanda

"Canario Morado," "Allamanda Morada" (fig. 2, *B*, and *C*, *c*)

The violet allamanda was introduced into Puerto Rico by the Forest Service. Plants of this Brazilian climber have been growing at Mayaguez since 1935. It is a relatively slow grower and, if unsup-

ported, will eventually have a shrublike appearance. Its chief use is in limited areas where more vigorous allamandas could not easily be restrained. The unusual violet-purple color of the flowers makes it desirable under certain conditions.

The 2-inch flowers usually appear only in limited numbers in pairs at the ends of short flowering branches. Fruit are very seldom seen. The leaves are formed in whorls, usually in fours. The light green



FIGURE 3.—Yellow shower vine, *Anemopaegma chamberlaynii*, produces occasional flushes of flowers that, after a day or two, fall like a shower.

leaves are smaller than the other allamandas, seldom over 4 inches long. Both the stem and leaves are covered with short, fine hairs which are chiefly noticeable on the young growth.

It can be propagated by cuttings or grafted onto Henderson allamanda for more vigorous growth.

Anemopaegma chamberlaynii (Sims) Bur. & K. Schum. (P. I. 9662)

Synonym: *Bignonia chamberlaynii* Sims

Goldentrumpet (fig. 3)

This native of Brazil was obtained in 1923. It has grown for many years on a *Pithecellobium dulce* tree, whose leaves it closely re-

sembles. The vine grows on all the major branches without apparently causing serious competition. It is also a very satisfactory "dress" for wire fences.

The bright-yellow flowers are produced at irregular intervals, usually in sufficient numbers to attract the attention of visitors. The period of flowering lasts only a few days, after which the flowers fall like a shower to blanket the earth below. Each 1- to 2-foot pod contains up to 200 seeds completely encircled by wide membranaceous wings. The leaves consist of two leaflets 2 inches long with a tendril

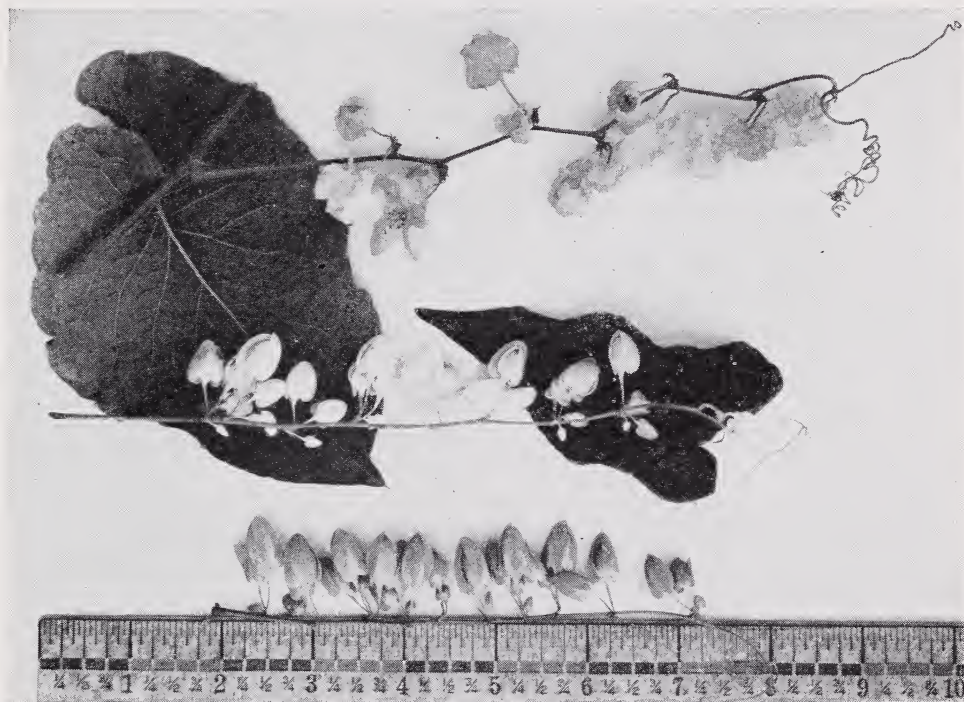


FIGURE 4.—The antigonons are particularly useful for tropical landscape planting because of their graceful, free-flowering character. *a* The upper flower stalk is *Antigonon macrocarpum*, with wide, rolled-back petals. The central *b* and lower *c* views show the white and pink forms of *A. leptopus*.

between that drops after the vine has been secured by the new growth above.

It is propagated by seeds.

Antigonon leptopus Hook. & Arn.

Mountain Rose

"Coralina," "Coralilla," "Bellosinia," "Bellisima" (fig. 4)

The mountain rose is a native of Mexico and Guatemala. It has been growing at Mayaguez since 1937 and is found in gardens and fences all over the island, climbing rapidly by tendrils. Since it is not particularly palatable to goats, it can succeed on fences along public roads, producing a mass of pink color. It is particularly effective in combination with the white variety. At the Federal Experiment Station it is established on many of the fences. The flowers are well adapted to flower arrangements because of the delicate texture.

The flowers are borne in large numbers along delicate, graceful, branched flower stalks which terminate in tendrils. The leaves are heart-shaped at the base, increasing slowly in size with the growth of the plant to a length of 5 inches. Seeds are occasionally produced, characterized by winglike membranous ridges running from end to end of the $\frac{1}{2}$ -inch-long seed.

The plant is propagated from seed, cuttings, or from layers.

Antigonon macrocarpum Britton & Small
Large-flowered Coralvine (fig. 4, a)

This antigonon is a native of Costa Rica but has been cultivated occasionally in Puerto Rico for a number of years. It has not become so widely known as the coralilla, which it resembles, because it grows less vigorously and is damaged by insects which kill the tissue in small irregular areas over the leaf surface. These areas later dry out and leave holes.

The large-flowered coralvine serves the same purposes as the coralilla but is more showy because of the larger, recurved sepals which grow with the developing seed. The seed is also larger and sharply angled. The leaves are covered with very fine short hairs which give a clothlike texture but are difficult to see without the aid of a magnifying glass.

It can be grown from seeds or cuttings.

Aristolochia argyroneura Gentil
Cannibal Vine (fig. 5, a, A)

This plant is not widely known in Puerto Rico. The Federal Experiment Station introduced it to Puerto Rico in 1937 from the Atkins Institution of the Arnold Arboretum in Cuba. The large shiny leaves serve as an attractive screen for porch or fence, and the flowers, which are not conspicuous, are an interesting novelty. Although the odor produced by the flowers is somewhat disagreeable, it is usually too weak to be noticed outdoors. It attracts certain small insects, which enter through the hairy tube to meet their death in the cavity at the base of the flower.

The flowers are produced in clusters along the deeply ridged, pithy stem where the leaves have fallen. The tubular section of the flower is curved. The open surface is shaped like a long rectangle. The purple coloring near the entrance to the tube is much darker than the rest of the tube. The seeds are produced in grooved narrow pods 5 to 6 inches long. The dark, shiny, alternate leaves are heart-shaped, 6 inches long, with prominent light-green veins. Occasional attacks of leaf-chewing insects may mar the glossy green appearance.

Propagation is by seed.

Aristolochia galeata Mart. & Zucc. (P. I. 37893)²
Broadblade Dutchmans-Pipe
"Pelicano," "Gallito" (fig. 5, C)

Another *Aristolochia* which is seldom seen in Puerto Rico is the broadblade dutchmans-pipe. It was introduced in 1915 and has made fair growth in the station grounds. Its chief attraction is the curious-

²Numbers in parenthesis refer to accession numbers of the Bureau of Plant Industry, Soils, and Agricultural Engineering and are introductions of the Federal Experiment Station in Puerto Rico.

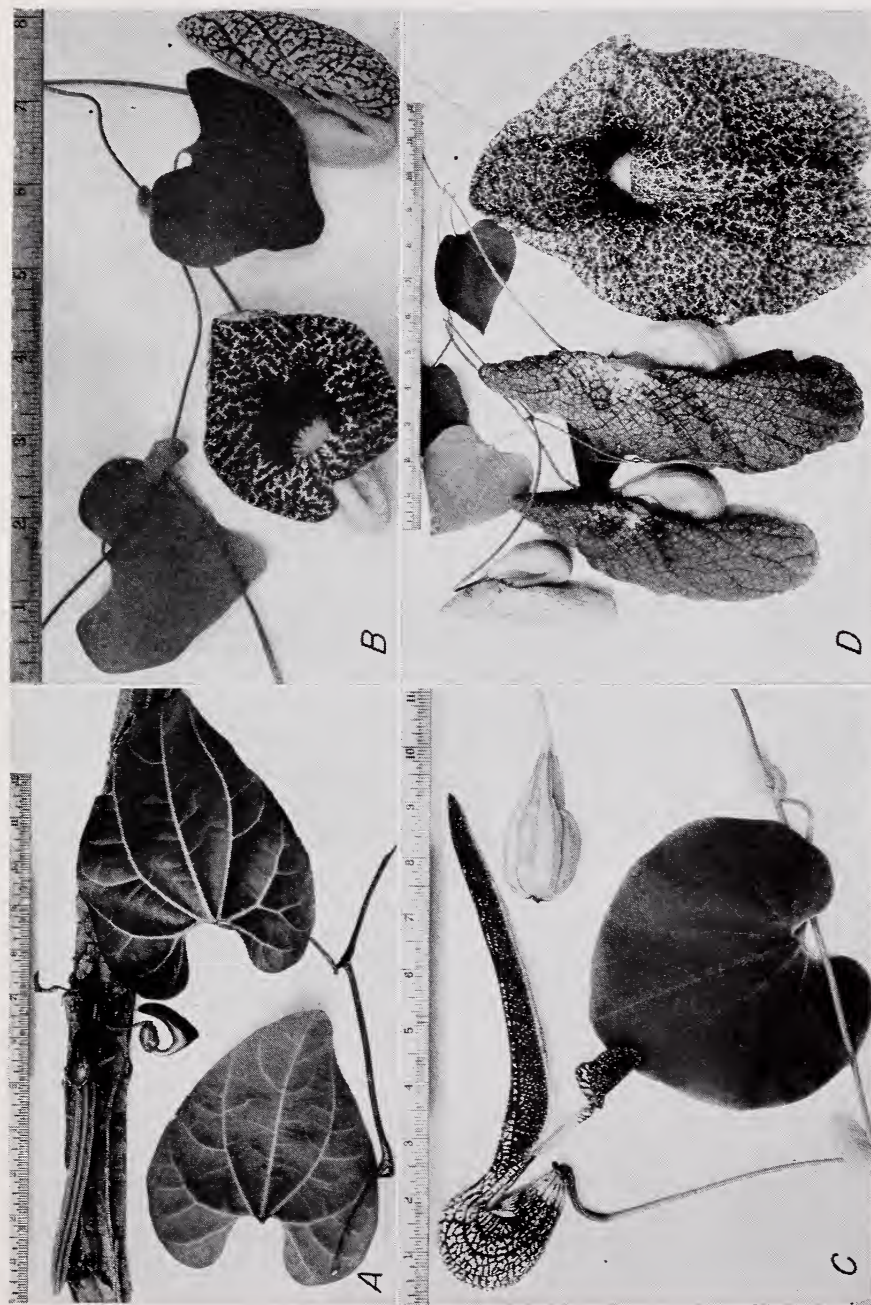


FIGURE 5.—Aristolochias or dutchmans-pipes are extremely variable in flower size and form: A, *Aristolochia argyra* produces flowers from older stems; B, *A. rigens* blooms in profusion; C, *A. galeata* has a curiously shaped flower resembling a bird's beak; D, *A. grandiflora* has flowers 12 inches long.

ly shaped flowers mottled cream and deep maroon. However, the foliage forms a desirable background, having a light-green, nonshiny appearance.

The maroon and white flower resembles a bird's beak because of a long slender V-shaped protrusion extending from a pouchlike base. The flowers are attractive as well as unique in form. They are produced in the leaf axils. The odor is not agreeable; however, it is not sufficiently strong to be objectionable. Insects are caught in the basal chamber of the flower. Seeds are produced in drooping grooved pods 3 inches long. The leaves are heart-shaped, dull green, with inconspicuous veins.

Propagation is by seeds.

Aristolochia grandiflora Swartz
Swan Flower (fig. 5, D)

This plant has been growing at the station since 1939. The flowers are produced a few at a time, during the rainy season. The foliage is sufficiently dense to form a screen.

The flowers, which are carried on individual short stems from the leaf axils, become 1 foot long and 8 inches wide. These gigantic flowers are mottled deep maroon over a creamy white background. The flower consists of three parts—a bulb about 3 inches long, a narrow tube lined with fine hairs, and the expanded maroon and white face attached to the tube just above the center where the color is deepest. When the flower is fully opened, the top part forms a hood over the opening of the tube. In bud the flower resembles a swan's head drawn back against the neck in rest. This flower does not give off a disagreeable odor as do some other closely related species. The leaves are small. The leaf blades become 4 to 5 inches long and almost as wide.

As no seed is produced, it is necessary to propagate this species by stem cuttings.

Aristolochia ringens Vahl (fig. 5, B)

This aristolochia is a recent introduction to Puerto Rico; therefore, little is known about its adaptability. It has grown fairly well at sea level on Catalina clay and made excellent growth when fertilized at an elevation of 600 feet, in a well-drained soil. It is useful for porch screening because it is devoid of any unpleasant odor.

It produces a profusion of elliptic flowers 3 to 4 inches long, mottled deep maroon and white except for a deep maroon blotch above the yellow opening of the tube. The tube and the chamber below are greenish white on the outside. The flowers are produced singly on slender flower stalks 3 to 4 inches long which branch from the stem just above each leaf. The point of attachment to the stem is covered with a leaflike bract $\frac{1}{2}$ inch long. Flowering is fairly continuous during most of the year.

The dropping fruit is 2 to 3 inches long, cylindrical with numerous ridges from top to bottom. When mature, the fruits open from the top to form a basket like an inverted parachute. The leaves are light green and roughly triangular in shape.

This plant is easily propagated from seeds.

Arrabidaea pachycalyx Sprague (fig. 6)

This vigorously vegetative vine is native to the Pacific slopes of Central America. In its native habitat it is so showy that it can be seen from a long distance when in bloom but it has flowered sparsely at Mayagüez. It may flower more freely on a different soil type or at a higher elevation. This vine was introduced from Panama by the Federal Experiment Station in 1940. Its vigorous growth can best be utilized where there is plenty of space, making a dense screen. It becomes woody at the base and will eventually become a shrub if unsupported.

The flowers are lavender with white throats formed on flowering stalks from the leaf axils often several feet below the branch tips.



FIGURE 6.—A many-flowered stalk of *Arrabidaea pachycalyx*.

The individual flowers are $1\frac{1}{2}$ inches in diameter and the same length with 5 petals spreading at the upper end of a funnellike throat. Up to 50 flowers may be produced from a single flower stalk. The leaves consist of 2 leaflets and a long tendril in place of the terminal leaflet. Occasionally a third leaflet is found in place of the tendril. This tendril drops as new leaves are produced above, leaving the two large leaflets 4 to 6 inches long. The leaves are slightly susceptible to an unidentified rust fungus.

Propagation is usually by semihardwood cuttings.

Asparagus plumosus Baker

Fern Asparagus

"Abeto," "Ala de Pájaro," "Helecho Plumoso" (fig. 7)

One of the world's better known vines is the fern asparagus, which is commonly used as a filler for flower arrangements by florists. It is



FIGURE 7.—A, The fern asparagus is useful for decoration. B, Insignificant greenish-white flowers and small green fruits that turn red on ripening.

a native of South Africa and is now grown commercially in Florida in large lath houses covering many acres. It does not prosper in full sun but can be grown in locations varying from slight to considerable shade. It is useful wherever a lacy texture is desired. The flowers are inconspicuous and the fruits too small to attract attention.

The leaves are many times divided, making a fine-textured, fern-like foliage. The seeds are green at first, ripening to red, and finally a dark blue.

Propagation is by seeds or division of the roots.

Bauhinia cumanensis H. B. K. (P. I. Nos. 110893-4)

Chain Vine

"Bejuco de Cadena" (fig. 8, B)

A native of Venezuela, this showy vine was introduced into Puerto Rico in 1940. It has grown nearly to the top of some 30-foot trees on poorly drained soils at the Federal Experiment Station. Perhaps the most interesting feature is the flattened undulating stems that look, where unsupported, like a climbing snake. Although a profuse bloomer in their native habitat, the vines have not flowered freely under the conditions mentioned above. In April there is usually a heavy bloom. Occasional clusters are also produced during the summer. The individual, fragrant, white flowers are small, with one in-curved petal. They are produced in clusters at the tips of the branches. The seeds are formed in small brown pods. The 2- to 3-inch alternate leaves are divided almost to the base by a deep cleft down the center.

Propagation is by seeds.

Bauhinia galpini N. E. Br.

Red Bauhinia (fig. 8, A)

This African woody climber has been growing at the station since 1937. Its distribution has been retarded because seeds are seldom set and cuttings root with difficulty. It is a vigorous grower that has "shrubbed up" when unsupported. In large areas where it can expand freely, it is desirable for its profusion of brilliant orange-red flowers that appear from May to October. The small leaf size makes it unsuitable for screening. The flowers hold fairly well when cut, better than most bauhinias.

The flowers develop in clusters of 5 to 10 at the ends of many side branches. The petals are characterized by their slender bases. The dark-brown seed pods which are very infrequently seen are 4 to 5 inches long and contain 4 to 7 brown, flattened seeds ripening in the fall. Like other bauhinias the leaves are partially divided down the center. The leaf is 1½ to 2 inches long and 2 to 3 inches wide, alternately placed on stems that climb by twisting at the tips.

Seeds germinate readily but cuttings are so difficult to root that layering is advisable if no seeds are set.

Beaumontia grandiflora (Roxb.) Wall.

Easter Heraldtrumpet

"Trompeta" (fig. 9)

The Easter heraldtrumpet, a native of northeast India, has been growing for many years at the station. Because it is not easily propagated, it has not become common in the gardens of the island. It

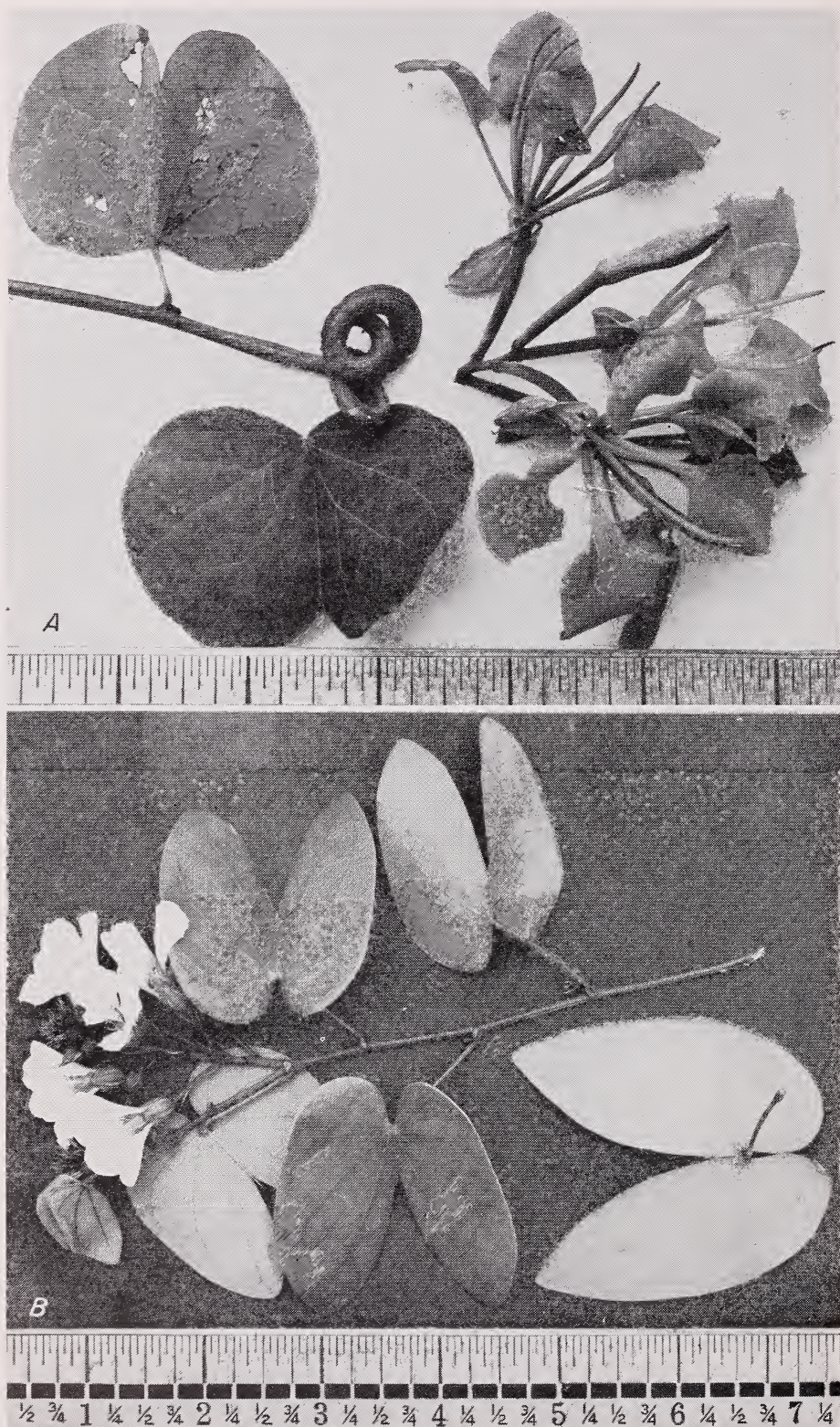


FIGURE 8.—Two bauhinias which climb are (A) the orange-flowered *Bauhinia galpini* that climbs by curling branch tips, and (B) *B. cumauensis*, a white-flowered fragrant climber with deeply cut leaves.

can be used effectively climbing on fences or the trunk of large trees without causing serious competition with the tree leaves.

The flowers appear from December through March but not continuously and usually not in sufficient quantity for a mass effect. The white, Easter-lily-shaped flowers are about 6 inches long and appear on short side branches. The dark-green glossy foliage alone is sufficiently attractive to justify its use. The leaves are much



FIGURE 9.—*Beaumontia grandiflora* grows high when supported. The luxuriant dark-green foliage is an effective background for the large white flowers.

lighter green on the underside and have prominent veins. They develop slowly reaching 8 to 9 inches in length when mature.

Seed is seldom seen under Mayagüez conditions. Stem cuttings are difficult to root, so that propagation can best be made by root cuttings.

Bougainvillea
Bougainvillea
"Trinitaria" (fig. 10)

In tropical areas there is probably no ornamental vine more commonly grown and few plants more floriferous than the bougainvilleas. They are adapted to a wide range of soils and tolerate a considerable range in temperature. They are better adapted to a slightly cooler climate than found at sea level in Puerto Rico as evidenced by superior growth, particularly of the white variety, in winter and at higher elevations. Bougainvilleas are vigorous growers, especially the varieties of *B. spectabilis* Willd., which will climb over house roofs or develop into large shrubs if unsupported. They can, however, be

restrained by regular pruning to serve as hedges. This type of pruning tends to reduce the flower production.

The slender tubular flowers are relatively insignificant; the mass of color is produced by a set of leaflike bracts which surround each flower cluster. There is a wide variety of color available from white



FIGURE 10.—Bougainvilleas come in a variety of colors. (A) The flower detail of the white variety, and (B) the over-all effect are shown.

and purple in the species *Bougainvillea glabra* Choisy, to salmon, pink, and red in the *B. spectabilis* varieties. Other varieties of hybrid origin include colors such as magenta, orchid, violet, and a rusty orange. The size of the bracts also varies considerably, reaching $1\frac{1}{4}$ inch or more in some varieties. The leaves vary in shape and size among varieties, usually dark green with a leaf stem $\frac{1}{2}$ to $1\frac{1}{2}$ inches long. The stems become woody and produce spines which reach a length of over an inch, particularly in the *B. spectabilis* varieties.

Seeds can be produced by hand-pollination, but propagation is relatively easy by thick hardwood cuttings. This is the only reliable method of reproducing the superior varieties.

***Calonyction aculeatum* (L.) House**
Large Moonflower
"Bejuco de Vaca," "Claro de Luna" (fig. 11)

Moonflowers are occasionally grown in Puerto Rican gardens. They are well known in warmer countries of both hemispheres. The twisting petioles attach the stems to any support of small dimensions. The vines are vigorous, climb rapidly, and begin to flower in about 6 weeks from planting. They make a good porch screen if strings or wires are placed for support. The large showy white flowers open in the late afternoon or early evening and close early the following morning. They produce a delightful, delicate aroma when open.

The individual flowers are 3 to 6 inches in diameter. The slender tube is usually somewhat longer than the width of the showy, spreading, snow-white face formed by the united petals. Five greenish-white bands, the sections exposed in the bud, radiate to the outer margins. The flowers are produced in small clusters on stalks up to 4 inches long in the axils of the leaves. The seeds are produced in rounded 1-inch capsules. The alternate leaves are heart-shaped,

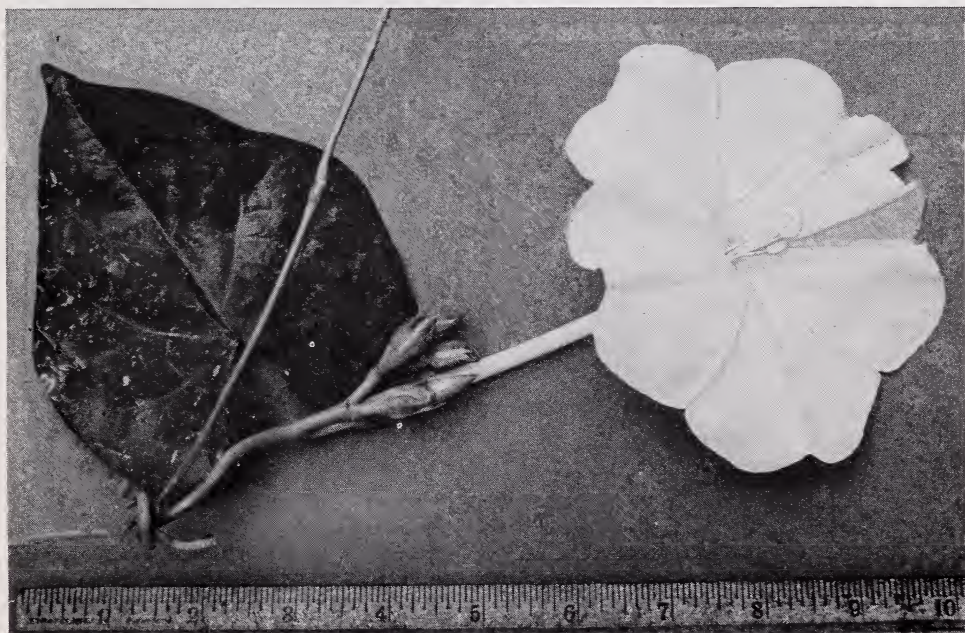


FIGURE 11.—The large moonflower, *Calonyction aculeatum*, opens in the evening.

4 to 6 inches long on slightly shorter leaf stems. Fine, rootlike protuberances frequently develop along the stem. Both the leaves and stem are subject to insect attacks.

For rapid germination, the seed should be nicked or soaked in warm water for several hours before planting.

Cissus rhombifolia Vahl
Synonym: *Vitis rhombifolia* Baker
Venezuelan Treebine (fig. 12)

This South American vine has been growing at the station at Mayagüez for many years. It is a slow grower and seldom flowers. It is

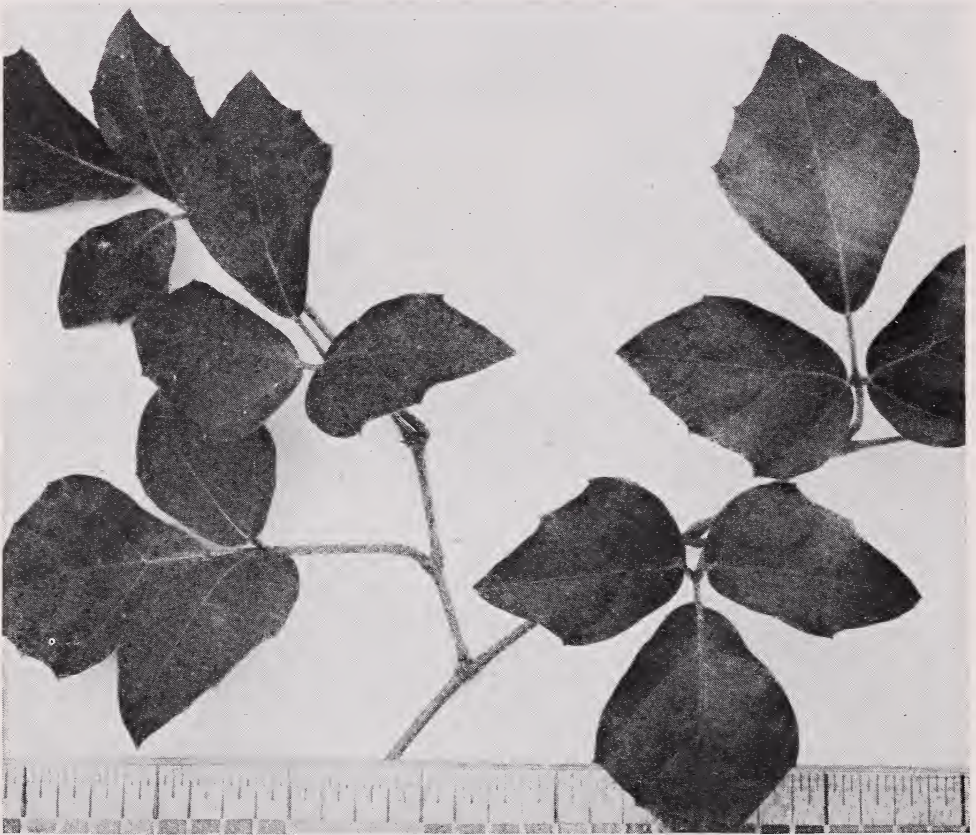


FIGURE 12.—The grape ivy leaves are dark and shiny.

capable of growing in considerable shade but is not adapted to sunny locations. It is also a good pot plant and can be grown indoors. The dark-green shiny foliage makes a fine background for more showy planting.

The leaves consist of three leaflets, the end one diamond-shaped, the two lateral leaflets are irregularly wider on the lower or side toward the stem. Several short points project from the outer margin of the leaflets at the end of the veins. The stem is covered with fine brown hairs when young and often bends away from the leaf at the node.

Cuttings will root slowly if carefully protected and cared for.

Clerodendron thomsonae Balf. f.
Bleedingheart Glorybower
"Bandera Danesa" (fig. 13)

This beautiful West African vine has been growing at the station for a number of years and is occasionally seen in gardens and patios of Puerto Rico. It is grown chiefly for the striking color combination of red petals and white sepals; the latter persist during the maturing of the seed. When planted in the open, it is relatively short-lived, apparently succumbing to insect injury or a virus disease. It therefore appears more desirable in patios or similar locations by itself and sprayed when necessary.

The red petals are only $\frac{1}{2}$ inch in diameter on a very slender



FIGURE 13.—*Clerodendron thomsonae* has bright-red petals (left) that here look black. They make a brilliant contrast with the white sepals and blue-green leaves.

tube whose base is covered by the showy, white, long-lasting sepals $\frac{3}{4}$ inch long and tapering to a slender point. The flowers are formed in heads of 5 to 50 on purplish stalks at the tips of branches or axils of upper leaves. The seeds are borne in four-celled fruits. The opposite 3- to 5-inch leaves are dark bluish-green in color and form a splendid contrast to the red and white flowers.

Cuttings and seeds are the usual methods of propagation.

Clitoria ternatea L.
Queen's Slipper, Asian Pigeonwing
"Bejuco de Conchitas," "Zapatico de la Reina," "Deleite," "Papito" (fig. 14)

The queen's slipper is a native of the Moluccas. It is occasionally grown in greenhouses in the Temperate Zone for its attractive blue flowers. The vines have been growing at the station since 1935.

It will grow to 20 feet if supported but otherwise the soft thin branches remain near the ground. It is useful on fences and trellises, where it climbs by twisting the stem.

The flowers are usually dark blue but a white variety is grown which is less vigorous. Double strains do not appear to have any great superiority. The 2-inch pealike flowers are produced singly in the axils of each leaf on very short stems. There is no profusion of flowers but some display can be expected during most of the year except the dry season. There are usually 5 short-stalked leaflets (occasionally 7) in each compound leaf. The leaves are 4 to 6 inches



FIGURE 14.—The single blue form of the queen's slipper, *Clitoria ternatea*, is shown with a double flower and a seed pod.

long and arranged alternately on the stem. Seeds are rarely formed. The pods are only 3 to 5 inches long and contain 5 to 10 dark, shiny brown seeds $\frac{1}{4}$ inch long.

Propagation is easiest from seeds.

***Combretum grandiflorum* G. Don (F. P. I. No. 72993)**
Showy Combretum (fig. 15)

The showy combretum is a native of the Congo region, where the summers are hot and muggy and the winters very dry. It was introduced into Puerto Rico in 1933 and has proved well adapted to lowland conditions. It grows well in sunny places on fences and other intermittent supports. Extending branches reach out several feet from the support to give an almost hedgelike appearance. After



FIGURE 15.—A, The showy combretum covering a fence. The vine on the roof above is the shower of orchids, *Congea tomentosa*. B, Only a color photograph could adequately show the brilliant orange-crimson color of the showy combretum flowers.

a severe pruning new growth occurs chiefly at the top, leaving the base relatively bare. So, it is advisable to cut all the tops to within 6 inches of the ground if severe pruning becomes necessary.

The individual flowers are small; the showy petals are only $\frac{1}{2}$ inch long and less than half as wide. The intense orange-crimson color and large numbers of flowers compensate for the small size of the single flowers. The flowers are produced toward the ends of the

stems on special flower stalks. Those produced on the lower side of the stalks bend toward the light so that all flowers face outward. About 25 bright-red flowers with yellow stamens appear on each flower stalk and 4 to 12 stalks develop at the end of each branch. The flowering begins in late November and continues through January although occasional flower shoots are seen as late as March. The fruit is five-winged, serving as an additional landscape interest until it matures, when its color changes from light green to brown. The leaves are opposite, dark green, 4 to 6 inches long, and attrac-

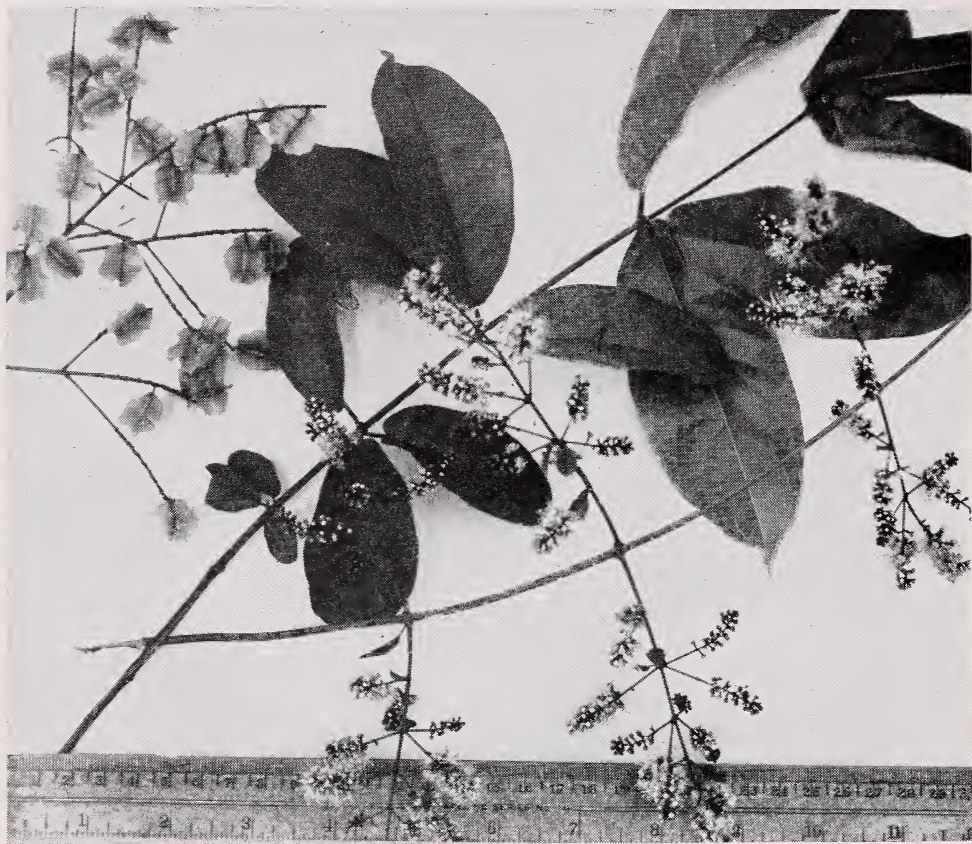


FIGURE 16.—The fruits shown at the left have an attractive bright, pinkish-red color (*Combretum* sp.).

tive throughout the year. Leaves at the base of the flower stalks frequently turn red during flowering.

Propagation is by seeds.

Combretum sp. (fig. 16)

This combretum is particularly useful because it is showy both in flower and fruit. The conditions limiting satisfactory growth of this species have yet to be determined for Puerto Rico. However, plants in clay soil have made vigorous growth. This woody vine if unsupported will eventually become shrublike in form. The habit of growth is not conducive to a tight screen as the lower portions of the stems

eventually drop their leaves. If the stems are pruned back to the ground, every year or two, it will help to control this trouble.

The minute, white flowers encircle the branching flower stems. The floral effect is delicate in texture with a yellow tinge from the stamens. The flowering season extends from early February to early April. The bright pink seeds are even more showy than the flowers. They are $\frac{1}{2}$ inch long, and have four or five wide wings. Because they do not wilt, they are well adapted to flower arrangements and personal adornment, as in corsages or for the hair. The leaves are produced in whorls of three on slender stems that feel velvety because of many minute hairs on the new growth. The leaf stems are only $\frac{1}{4}$ to $\frac{1}{2}$ inch long while the leaf blade reaches 3 to 5 inches with prominent veins.

It can be propagated from cuttings.

Congea tomentosa (Roxb.)

Wooly Congea

"Terciopelo," "Lluvia de Orquídeas" (fig. 17)

This plant of the East Indies is one of the showiest of the plants in the station collection. It was introduced into Puerto Rico by the station in 1927 and has been carried to many parts of the island because of its outstanding color display. A vigorous growth has been observed under a variety of conditions and at elevations up to at least 1,500 feet. It is a woody climber which appears adapted to roofs, fences, or other support even if several feet separate the various members of the support frame. The flower stalks hold well when cut and kept in water. If cut early in the flowering season and stored in bundles, base up until dry, they will keep for many months for use in a dry or "winter" arrangement.

The true flowers are insignificant, white dots with dark stamens. The showy portions are the bracts or modified leaves, 3 of which surround the base of every flower cluster. There are 2 to 10 clusters on each flower stalk and from 10 to 30 stalks at the end of each branch. With more than 100 branches on a large plant, the display is quite outstanding. These lavender-pink bracts begin to color in late October, but do not become brilliant until the beginning of the new year. The tone gradually darkens with the season until March or April, when the new growth starts.

The short-stalked leaves are grayish green, 4 to 7 inches long with the tips drawn to a slender point, and are arranged in pairs. The leaf surface has a scurfy feeling.

Because no seed are produced, propagation is by stem cuttings which are rooted with some difficulty.

Cryptostegia madagascariensis Bojer

Madagascar Rubbervine (fig. 18)

This woody climber was brought to Puerto Rico in 1935. It is a vigorous grower, well suited to a variety of soils and rainfall conditions. If pruned back, it will eventually mound up to give a shrub-like appearance. When grown near trees, it should not be permitted to climb as it competes strongly with the tree. It is useful on limited supports such as walls or for screening.

The lilac-colored flowers are 2 to 3 inches in diameter and are

produced in short flowering shoots at the end of the stems or side branches. The seeds are produced in three-winged, pointed pods 3 inches long. The 2- to 5-inch leaves are opposite and shiny green on short leaf stems.

Propagation is by seeds or cuttings.



FIGURE 17.—The lavender-pink bracts of the shower of orchids, *Congea tomentosa*, make an exceptional mass of color during the winter. See also figure 15, A.



FIGURE 18.—The cryptostegia will develop a bush form as seen in A. The pinkish-lavender flowers and winged seed pods are shown in B.



FIGURE 19.—This *Cydista aequinoctialis* has pinkish flowers with purple veins.

Cydista aequinoctialis (L.) Miers.
 Synonym: *Bignonia aequinoctialis* L.
 "Bejuco Blanco," "Liana de la Sierra" (fig. 19)

This vine is seldom seen in Puerto Rico although it is adapted to local conditions as it persists after cultivation and produces many flowers without care. It has not been sufficiently tested to determine its limitations or usefulness. However, it appears generally adapted for informal plantings.

The flowers are produced at the ends of short side branches in clusters of 6 to 25. The flowering period is prolonged as only 1 or 2 flowers of a cluster open at a time. The plant is showy in flower because there are many short flowering branches along the main stems. The individual flowers, 2 to 3 inches long, are lavender with darker streaks running from the petals down into the cream-colored throat. The leaves are opposite and compound, consisting of 2 leaflets and occasionally an unbranched tendril.

Cuttings are used to propagate this vine.

Ficus pumila L.
 Climbing Fig

"Paz y Justicia," "Hiedra," "Yedra" (fig. 20). See also cover figure

The climbing fig is native to China and Japan. This vigorous grower is capable of covering a house several stories high and grows well both in sun and shade but is subject to a fungus under moist conditions. This is one of the few vines particularly adapted for climbing on wood or concrete walls. Special rootlike attachments called holdfasts grow along the stem and become attached to the support.

Two types of foliage are produced. The first, or juvenile, type has slender stems and small, heart-shaped to oblong leaves $\frac{1}{2}$ to $\frac{3}{4}$ inch long. Both the stem and leaves are very close to the supporting surface. Later after the plant has made considerable growth, the mature type appears bearing thick shiny leaves 3 to 4 inches long on stems $\frac{1}{4}$ inch or more in diameter. These branches are usually above or away from the supporting wall. Only this mature type of growth produces the internally flowering fruits, which are 2 to 2 $\frac{1}{2}$ inches long and nearly cylindrical and are not edible.

This vine can be propagated by cuttings.

Hylocereus trigonus (Haw.) Safford
 Synonym: *Hylocereus triangularis* Hort.
 Nightblooming Cereus
 "Pitajaya" (fig. 21)

Since the introduction of this leafless climber of the cactus family to the station in 1935 it has climbed as high as 60 feet in tall trees. It is grown primarily for the large white fragrant flowers that are produced at intervals of about 5 weeks during the summer under Mayagüez conditions. Each period covers only two or three nights as a single flower opens only once. It requires only a few flowers for a gorgeous display because of their size; and the fragrance penetrates for some distance.



FIGURE 20.—(A), *Ficus pumila* grows close to a wall or other support when young (a); the mature foliage (b) is much larger and produces the internally flowering fruit (c). See also cover illustration.



FIGURE 21.—(A), The nightblooming cereus, *Hylocereus trigonus*, can grow on walls or trees, blooming in flushes during the summer nights with large white fragrant flowers (B).

The flowers are 1 foot in diameter and have white petals and a mass of yellow stamens. They are produced individually on very short flower stems. Occasional red fruits with white flesh are formed, having an agreeable taste and a laxative effect on the system. The green stems are prominently three-ridged and have occasional pairs of minute spines along the ridges.

Sections of the stem are easily rooted for propagating.

Jasminum azoricum L.
Azores Jasmine
"Jazmín Oloroso" (fig. 22, C)

The name Azores jasmine indicates the origin of this slender climber that has been growing at Mayagüez since 1934. It is not a vigorous grower under Mayagüez conditions but has a more graceful texture than the Gold Coast jasmine. It is useful in patios and limited areas where the more vigorous types would be difficult to control.

The slender white flowers are carried in loose clusters at the tips of side branches that develop from the older leaf axils along the main stem. The flowers are 1 inch in diameter. The very slender tube is slightly longer. The opposite leaves are compound, consisting of three leaflets. The central one is slightly larger than the others. They are 1 to 2 inches long and equally wide. The leaf and leaflet stems are grooved on top and are slightly shorter than the blades.

The plants may be propagated by stem cuttings of nearly mature wood. No seeds are set under Mayagüez conditions, but this species has proved a troublesome weed in the vine collection of the U.S.D.A. Plant Introduction Garden at Coconut Grove, Fla., where it seeds freely.

Jasminum dichotomum Vahl (F. P. I. No. 73067)
Goldcoast Jasmine (fig. 22, D)

This fragrant white-flowered jasmine was introduced from the African Gold Coast in 1942. It has proved to be a regular but not particularly profuse bloomer. It has grown vigorously in this vicinity and appears satisfactory for screening. The slight but agreeable fragrance is an added attraction.

The flowers are white with pink-tinged buds, produced in many branched clusters from the ends of branches. Only a few flowers open at a time so that each cluster flowers for a long time. The fruit are olive-shaped but slightly smaller and, like the olive, turn from green to blue black on ripening. The 3- to 4-inch leaves are opposite and shiny without divisions, but a joint on the leaf stem indicates where leaflets were attached at an earlier stage in its evolution.

Propagation is by seeds.

Jasminum pubescens Willd.
Synonyms: *J. hirsutum* Willd., *J. multiflorum* Andr.
Furry Jasmine
"Jazmín de Papel" (fig. 22, A, B)

One of the better known jasmines is the furry jasmine from India. The plants were first brought to the station in 1934. This species is naturally a semiwoody climber but if regularly pruned back will in time become a shrub and as such will make a beautiful hedge. It grows

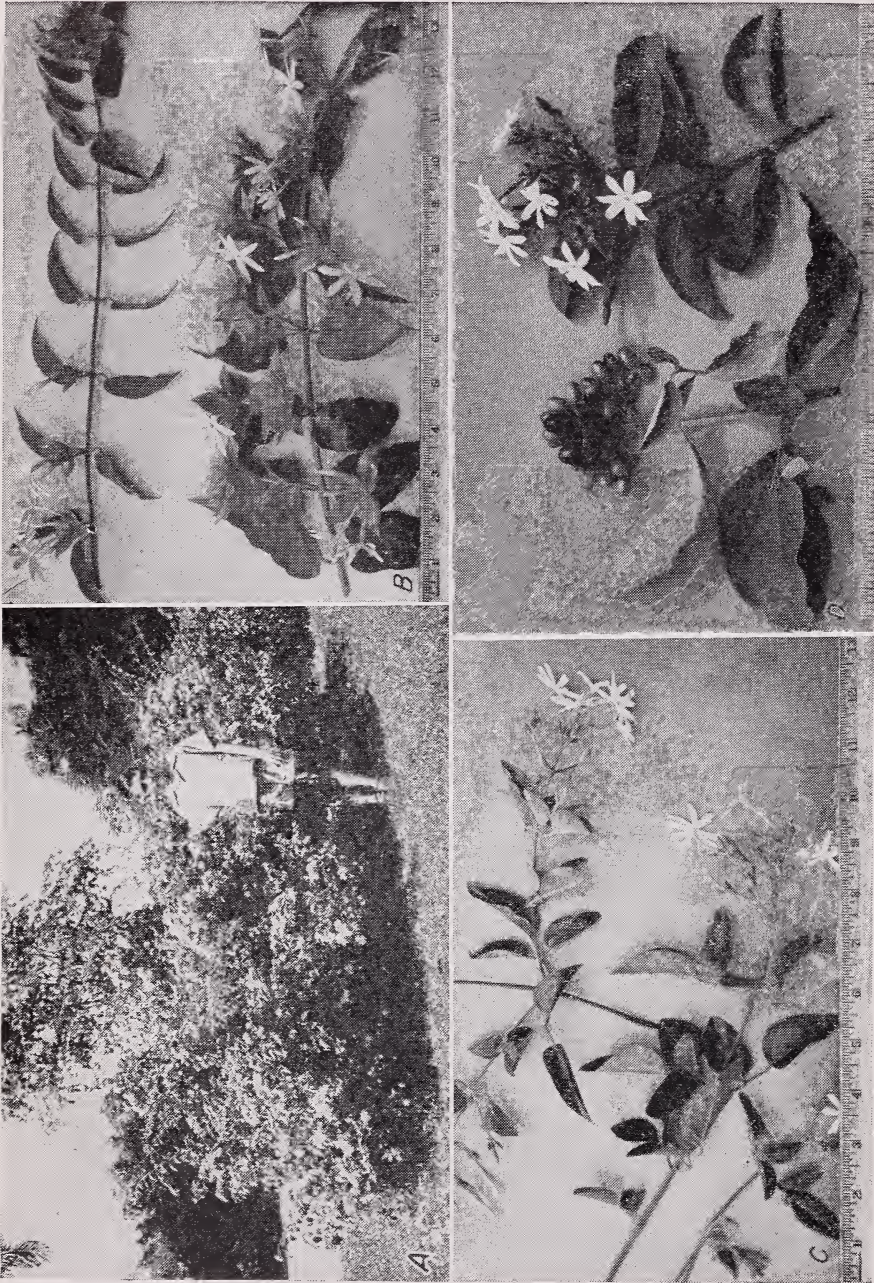


FIGURE 22.—Jasmines are colorful and often fragrant. (A), *Jasminum pubescens* regularly pruned for use as a hedge. Flower detail is shown at B. (C), The *J. azoricum* has compound slender leaves with a graceful habit. (D), *J. dichotomum* has fragrant flowers in compact flower heads.

best in full sun but tolerates considerable shade, with a consequent reduction in flower production. The flowers are not fragrant but hold fairly well in flower arrangements after cutting.

The white flowers form in clusters at the tips of short side branches. The seven or eight petals spread to 1 inch from a slender tube of the same length. A fine grayish fur covers the sepals, stems, leaf stems, and the undersurface of the leaf blades, particularly the midrib. The opposite leaves are 1 to 3 inches long, slightly heart-shaped at the base, and tapering to a slender tip.

The stems may be divided into cuttings for propagation.

Lonicera japonica var. *Halliana* Nichols
Hall's Japanese Honeysuckle
"Madreselva" (fig. 23)

Hall's honeysuckle has become naturalized in sections of continental United States. In Puerto Rico it is not quite as vigorous a grower but will succeed if given a little care. It is tolerant of both full sun and considerable shade and grows satisfactorily even in poor soils. The slender stem twines around available supports, adapting it to any open form of support such as fences and trellises. It is also useful for flower arrangement as buds will continue to open a day or two after cutting.

The fragrant flowers are produced throughout the year, a pair from the axil of each leaf. Each pair develops on a short common stem with a pair of leaflike bracts at their base. The flowers are tubular, 2 inches long, with petals flaring near the ends, one petal more deeply cut than the others. The flowers are white when they first open but turn creamy yellow the next day. The opposite dark green leaves are 2 to 3 inches long. There is a sparse cover of fine hairs on the stems, especially when young.

The plant may be propagated rather easily by layering or division.

Monstera deliciosa Liebm.
Synonym: *Philodendron pertusum* Kunth & Bouché
Ceriman, Monstera
"Piñanona" (fig. 24)

From Central America the ceriman has been carried to many parts of the world and is frequently seen in Puerto Rico. In the Temperate Zone it is grown in large conservatories, while in frost-free areas it can be utilized as a ground cover or as a high-climbing vine. Because of the large dimensions it should be used only in large areas. The fruits are edible when fully ripe and have a pleasant odor, but occasional calcium oxalate crystals, especially if the fruit is not fully ripe, slightly pucker the mouth. The plant is capable of growing under extremely low light intensities and is therefore adapted to indoor culture if grown in large pots or tubs.

Under Mayaguez conditions the white flowers are not at all common and so short-lived as to have very little attraction. The dark-green fruits are cylindrical, 8 to 10 inches long, and 2 to 3 inches in diameter. The broad leaf blades are more than 2 feet long, deeply cut, and frequently perforated. The leaf stems are even longer than the blades and deeply grooved on top.

It may be propagated by half burying 1-foot sections of the stems in decomposed leafmold or soil high in organic matter, preferably at the place where they are to grow.



FIGURE 23.—Hall's Japanese honeysuckle (*Lonicera japonica* var. *halliana*). A. The flower buds are formed near the growing tip, enlarge slowly, and do not open until the stem has made considerable new growth. B, A close-up of open flowers showing one petal more deeply cut than the other.

Nephtytis afzelii Schott
 Synonym: *N. liberica* N. E. Br.
Nephtytis (fig. 25)

This *nephtytis* has been growing on the grounds of the station at Mayagüez for many years. It serves both as a ground cover and as an ornamental climber. While not as tall growing as the *monstera*



FIGURE 24.—*Monstera deliciosa* has edible fruit and grows as a ground cover or will climb tall trees.

or some philodendrons, it also functions as a tree-trunk decoration. The stems send out roots at almost every node. It is not adapted to full sunlight as the leaves turn yellow under this condition, but it grows well under a wide range of light intensities.

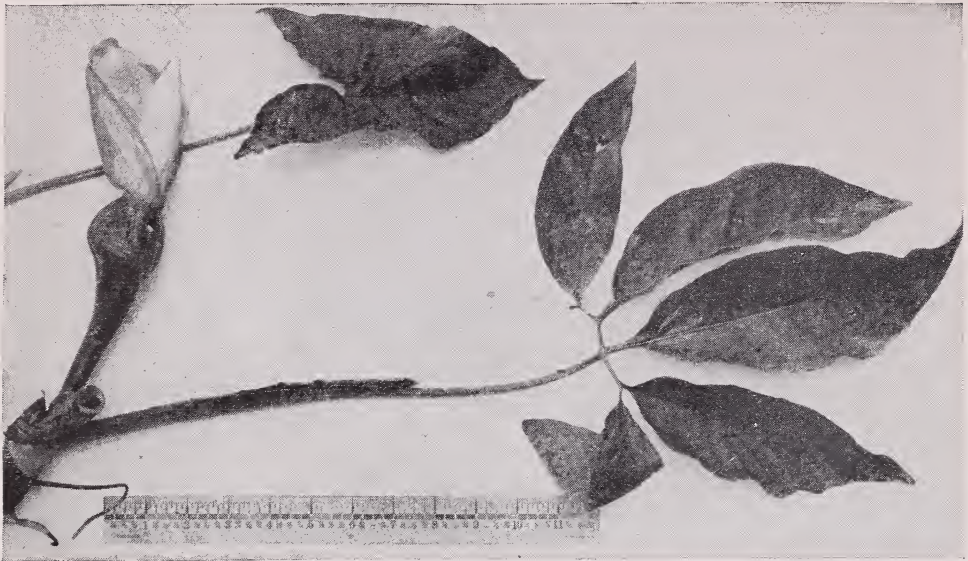


FIGURE 25.—*Nephthytis afzelii* has small arrowhead-shaped leaves when growing on the ground, but larger divided leaves and flowers appear only on climbing stems.

When the stem is on the ground, the leaves are small and arrowhead-shaped, and the blades only 5 to 8 inches long, but as soon as it begins to climb, the leaves increase in size and divide into three, five, or more leaflets. Flowers are creamy white but not particularly effective as a landscape feature because of their short life and small numbers. The green seed head, although persisting for some time, is inconspicuous. The seeds are embedded in organ-yellow flesh which scales off the fruit when mature.

The vine is propagated by stem cuttings several nodes long as seeds are apparently nonfunctional, at least under Mayagüez conditions.

Passiflora edulis Sims (P. I. No. 103016)
Purple Granadilla
"Parcha" (fig. 26, C)

The seed of the vines now growing in the grounds of the station at Mayaguez were obtained in 1933 from Brazil, where the vine is native. It is cultivated in Ceylon as a source of "pashe" juice, a delicious drink made from the pulp with sugar and a bit of bicarbonate of soda added. In the same country it is also used for screening, climbing by strong tendrils. The vigorous growth made at Mayagüez indicates a similar usefulness here.

The flowers are 3 inches in diameter with white petals and numerous rays. The inner half is purple and the rest of the flower white. It opens in the afternoon. The base is enclosed in three leaflike bracts that persist during the development of the fruit, which grows to the size and shape of a hen's egg, turning yellow or purple on ripening. The alternate curly leaves have three lobes or, when small, no lobes at all. The margins are toothed, and the leaf stalk has two purple glands just below the blade.

Propagation is by seed.

Passiflora foetida L.
Tagua Passionflower
"Taguatagua" (fig. 26, B)

A small wild passionflower found through the West Indies and tropical America is the taguatagua. It grows as a ground cover in open fields where no support is available and on fences, porches, or other supports. The fruits are not as desirable as some other passionflowers but the plants are more easily grown. The leaves form a satisfactory screen if regularly supported but will not easily exceed a height of 6 or 8 feet. The flowers are not effective except at night, as they close early in the morning. However, the much-divided bracts at the base of the flower persist, turning orange color along with the fruit when it ripens.

A tendril and a flower on a slender flower stem 2 inches long are produced in the axil of each leaf. The flowers are 1 to 1½ inches in diameter with white or pinkish-white petals and a whorl of rays purple on the inner half. The seed pods are ¾-inch long and have six fine grooves running from base to tip, orange yellow when mature. The leaves and stems are covered with sparse hairs. Indenta-



FIGURE 26.—Passionflowers are a welcome addition to the home planting as several produce fruit for drinks and desserts. (A), *Passiflora quadrangularis*, a high climber if support is available, with large flowers and edible fruit. (B) The *P. foetida* has small yellow or orange fruits. It flowers only at night. (C), *P. edulis* is cultivated to a limited extent in some countries for its fruit juice.

tions on either side of the alternate, 3- to 4-inch leaf blades separate the margin into three lobes.

Propagation is by seed, which are washed free of pulp before planting.

Passiflora quadrangularis L.
"Granadilla" (fig. 26, A)

From tropical America comes the granadilla, a vigorously growing, passionflower vine with very large fruits which are useful in making drinks and ice cream. The vines will climb in trees to considerable height, but the resulting appearance is not as satisfactory as that obtained from some other vines listed for this purpose. It is more useful on a limited support such as a fence or trellis, where the foliage makes a good screen and the fruit is easily picked.

The 5-inch flowers hang downward so the red petals and purple and white rays are seldom fully effective. The fruit reached 9 inches in length and turns yellow when ripe. The wavy leaves, 5 inches long, are alternately arranged. They have margins with no indentations, and blunt tips and bases. The leaf stems carry two or three pairs of glands; and the main stems are quadrangular or almost ridged, with long tendrils in each leaf axil.

New plants are grown from seed.

Petrea volubilis L.
Purplewreath Petrea
"Petrea" (fig. 27)

Since 1932 the purplewreath petrea has flourished at the station at Mayagüez, P. R., from where it has been distributed to many parts of the island. It appears well-adapted to West Indian conditions. The blue flowers are more abundantly produced under full sunlight but the vine will tolerate considerable shade. The stems are easily trained to grow over pergolas, trellises, and similar structures.

Up to 25 flowers are formed on a slender terminal spike 6 to 8 inches long. The blue sepals open first, then the lavender petals which drop after a few days. The sepals persist, fading with the ripening of the fruit. The opposite leaves 3 to 4 inches long feel slightly rough to the touch.

Propagation is by seeds.

Philodendron dubium Chod. & Vischer (fig. 28, D)

This slow-growing vine has been growing at the station in Mayagüez since 1935. The stem of the original plant was cut and the top now secures its nutrients through long aerial roots which extend to the soil. It makes an interesting and attractive tree climber even if somewhat slow growing.

The leaves are deeply cut, with prominent light-green veins in the middle of sharply pointed sections. The leaf blade is almost 18 inches long. The leaf stems are almost twice as long. No flowers have been observed so far.

The stem can be cut into 1-foot sections for propagation.



FIGURE 27.—The purplewreath petrea has lavender petals which drop off after a day or two, but the blue sepals remain colorful for some time.

Philodendron erubescens C. Koch (fig. 28, A)

This philodendron is a slow grower adapted for climbing tree trunks. It is a relatively recent introduction to the station collection.

The flowers are white but the flower cover and young growth are a dark red. Traces of red are also found near the base of the leaf stem and along the margins of the arrowhead-shaped leaf blades. The lower lobes of the 15- to 18-inch leaves are blunt. The tip tapers to a point. The leaf stem is almost as long as the blade. The leaves are not as tough as those of some of the other philodendrons, so it must be planted in a sheltered location to avoid wind damage.

The plant can be propagated from stem cuttings.

Philodendron giganteum Schott
Giantleaf Philodendron
"Yautía Cimarrona" (fig. 28, C)

For many years this vine has been growing in the grounds of the station. The rate of growth has been particularly slow, perhaps in part the result of a somewhat unfavorable location. No flowers have been produced so far although the vine has grown to a height of about 20 feet. It is used primarily as a tree-trunk decoration.

The leaves are large, the blades reaching a length of over 2 feet, the tips tapering to a blunt point, while the lobes at the base extend 6 to 8 inches below the 3-foot leaf stem. The stem is 3 to 4 inches thick. It is covered with brown hairs and held securely to the bark of the tree by numerous aerial roots.

Propagation is by long stem cuttings.

Philodendron nechodomi Britton
Nechodoma's Philodendron (fig. 28, B)



FIGURE 28.—A number of philodendrons are adapted for use in shady locations. (A), *Philodendron erubescens* has a red tinge in buds, leaf, and flower sheathes; (B), *P. nechodomi* is characterized by a series of greenish-white dots along each side of the midrib of mature leaves; (C), *P. giganteum* is a slow grower with hairy stem; (D), *P. dubium* started at the base of a mahogany tree.

This high climber is found in a native state only in the Luquillo Mountains of Puerto Rico. The vines are cultivated for their attractive dark-green shiny foliage and the large size of the leaves which decorate bare tree trunks.

When young, the leaves are small, slender, and pointed and have no breaks in the margins; if the vine is permitted to climb the leaves increase rapidly in size to 30 inches with many divisions of the leaf blade almost to the middle. A series of white dots each about $\frac{1}{8}$ inch in diameter line each side of the midrib on the upper surface. The leaf stem also increases, reaching 15 to 18 inches. The flowers are seldom seen and short-lived. The fruit is inconspicuous, being cylindrical, dark green, and 8 to 10 inches long.

It can be propagated by stem cuttings at least a foot long which can be half buried in the leafmold at the base of the tree on which the vine is to climb.

Piper betle L. and *P. nigrum* L.
Betel and Black Pepper
"Pimienta" (fig. 29)

These two vines are practically identical as far as growth habit and leaf form are concerned. The source of commercial black pepper, *Piper nigrum*, is seldom seen in Puerto Rico. It is a decorative, shiny-leaved vine which grows on posts, trees, or fences, by means of rootlike holdfasts that are produced along the stem. The vines can grow in full sun or more slowly in considerable shade, making a good screen or tree trunk cover. While flowers are occasionally produced, the vines cannot easily be utilized as a source of pepper because of the processing involved. The betel pepper flowers a little more freely than the black but has the same character of growth.

In both species, the 4- to 7-inch leaves have slender tapered points and prominent veins branching from the base of the blade. The upper surface is dark and shiny. The nodes or joints of the stems are prominent. The stems usually bend away from each leaf, giving a slightly zigzag appearance.

Propagation is usually made from 1-foot stem cuttings half buried in leafmold and soil at the place where they are to grow.

Porana paniculata Roxb.
Christmasvine Porana
"Velo de Novia" (fig. 30)

This beautiful white-flowered vine is not yet abundant in Puerto Rico. Perhaps the flowering period is too short for some purposes. Yet the delicately textured, white mass of flowers that appear for about a month, chiefly in November, makes the vine well worth planting. It is a strong climber and will make an attractive screen to a height of 30 feet if given intermittent support around which the stems can twist.

The flowers are particularly useful in flower arrangements. The individual flowers are slender and only $\frac{1}{3}$ -inch long, appearing in clusters from the ends of the branches and from leaf axils near the branch tips. The seeds when produced are in globose hairy capsules



FIGURE 29.—A, A peppervine growing on the stem of a forest tree. B, A close-up of a pepper branch showing the dark, shiny, pointed leaves.



FIGURE 30.—The velo de novia or bridal veil (*Porana paniculata*) is covered with lacy white flowers in November.

but are seldom seen under Puerto Rican conditions. The leaves are alternate, up to 3 inches long, and have tapered tips and heart-shaped bases.

Propagation is by stem cuttings.

Pyrostegia ignea (Vahl) Presl

Synonyms: *Bignonia venusta* Ker., *P. venusta* Baill.

Flame Vine

"Fuego de San Juan," "Flora de Venus," "Lluvia de Fuego," "Siete de Bastos," "Tango" (fig. 31)

The flame vine is a native of Brazil, now cultivated in most of the Tropics because of its brilliant crimson-orange flowers. The foliage does not develop the mass of more "leafy" vines. A prominent place is justified by the splashes of color which it produced in winter and spring. It grows in well-drained soils. The vines have a tendency to grow at the top at the expense of the base, which becomes bare. Increased branching can be produced by cutting to the ground. Pinching the tops of the new shoots will help overcome this trouble. A stem rot sometimes forces new shoots as the older branches die out.

The slender, 2-inch flowers are tubular. The petals flare near the end. Numerous flowering stems from the end of short axillary branches bear clusters of 15 to 25 flowers. The opposite compound leaves consist of 2 leaflets 2 to 3 inches long and occasionally tendrils



FIGURE 31.—The flame vine or *Pyrostegia ignea* produces intermittently clusters of orange tubular flowers.

branched near the tip. Both the common and individual leaflet stalks are about 1 inch long. Very fine, sparse hairs are found on the under surface particularly on young leaves. The stem is prominently ridged, becoming pithy when old.

Propagation is by stem cuttings.

Quisqualis indica L.
Rangoon Creeper
"Corazón de Poeta," "Corazón de Hombre," "Cocuisa,"
"Cuiscualis" (fig. 32)

This woody climber has been cultivated for over a hundred years in the Far East. It is a native of the eastern coast of the Gulf of Bengal and has been growing in Mayagüez for many years. There is no strict requirement for soil conditions as vines have been noted growing under various conditions in different parts of the island. Its free flowering habit and vigorous growth are valuable assets for screening and for lending color to the landscape. It is not adapted for limited areas. The color of the flowers depends on the climatic conditions and their age. During the cooler periods or on cloudy days in summer, the flowers open white or flecked with pink. Later they turn a deep red. Under hot, sunny conditions, they open red and turn somewhat darker with age.

The flowers are produced in profusion from a great many flower clusters. The individual flowers have a very slender tube 2 inches long. The tube is often slit by an unidentified wasp for the nectar secreted at the base. Seeds are seldom produced but rudimentary five-angled or slightly winged pods sometimes grow to an inch or more. The short stemmed, opposite leaves are sparsely covered by very short brown hairs, particularly on the under surface near the midrib.

Propagation is by soft-wood, stem cuttings, or root cuttings.

Scindapsus aureus (Lindl. & André) Engl.
Synonym: *Pothos aureus* (Lindl. & André)
Solomon Island Ivyarum
"Amapola Amarilla," "Mata de Agua," "Trepapalo Amarillo" (fig. 33)

The late Capt. J. R. Capifali was apparently responsible for introducing this vigorous high-climbing vine to Puerto Rico. Given support, it will climb as much as 50 feet up the main trunk of a tree without spreading to the branches in competition with the tree. It is also a good ground cover, as shown in figure 33. Flowers are almost never produced but the golden-yellow streaks in the leaves provide interesting contrast with the green. This vine grows best in light shade but satisfactorily even when deeply shaded or in practically full sun.

When the vine is grown as a ground cover, the leaves remain relatively small and pointed, but as the stem climbs, the leaves increase in size until they are five or six times as large with a more rounded tip. The large leaves are often cut to the midvein. The stems are held to their support by aerial roots from every node. The alternate leaves are borne on one side of the stem, which they cover with sheath-like ridges that extend up the leaf stem.

Propagation is by stem cuttings usually several nodes long.

Sechium edule Swartz
Chayote
"Tallón," "Tallote" (fig. 34)

The chayote is well established in most sections of the American Tropics, where it is usually grown for food. However, it is a rapid

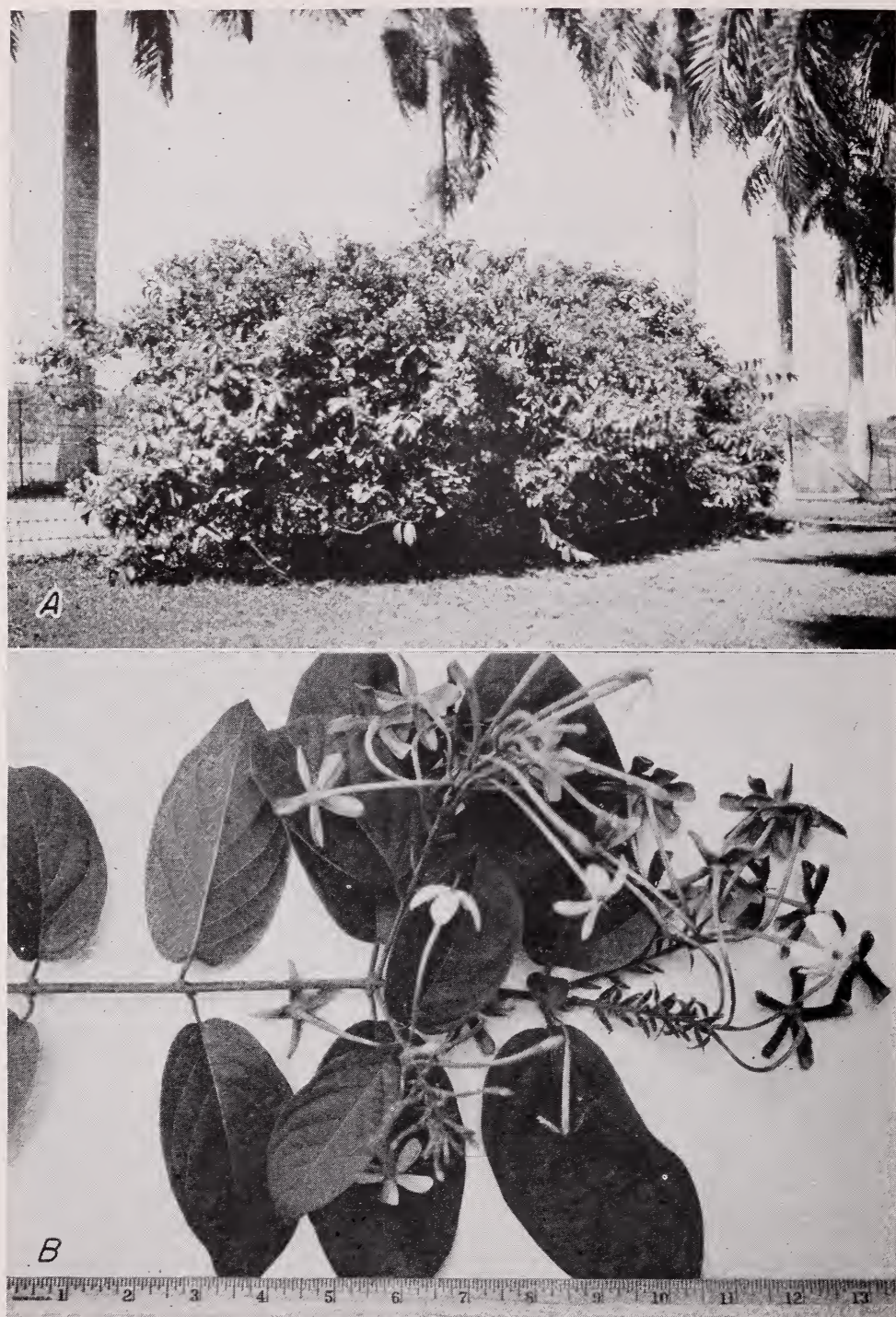


FIGURE 32.—For a colorful screen or fence cover (A) the *Quisqualis indica* is particularly useful because of its year-round flower habit and interesting change in color (B) from white or light red to dark red with age.

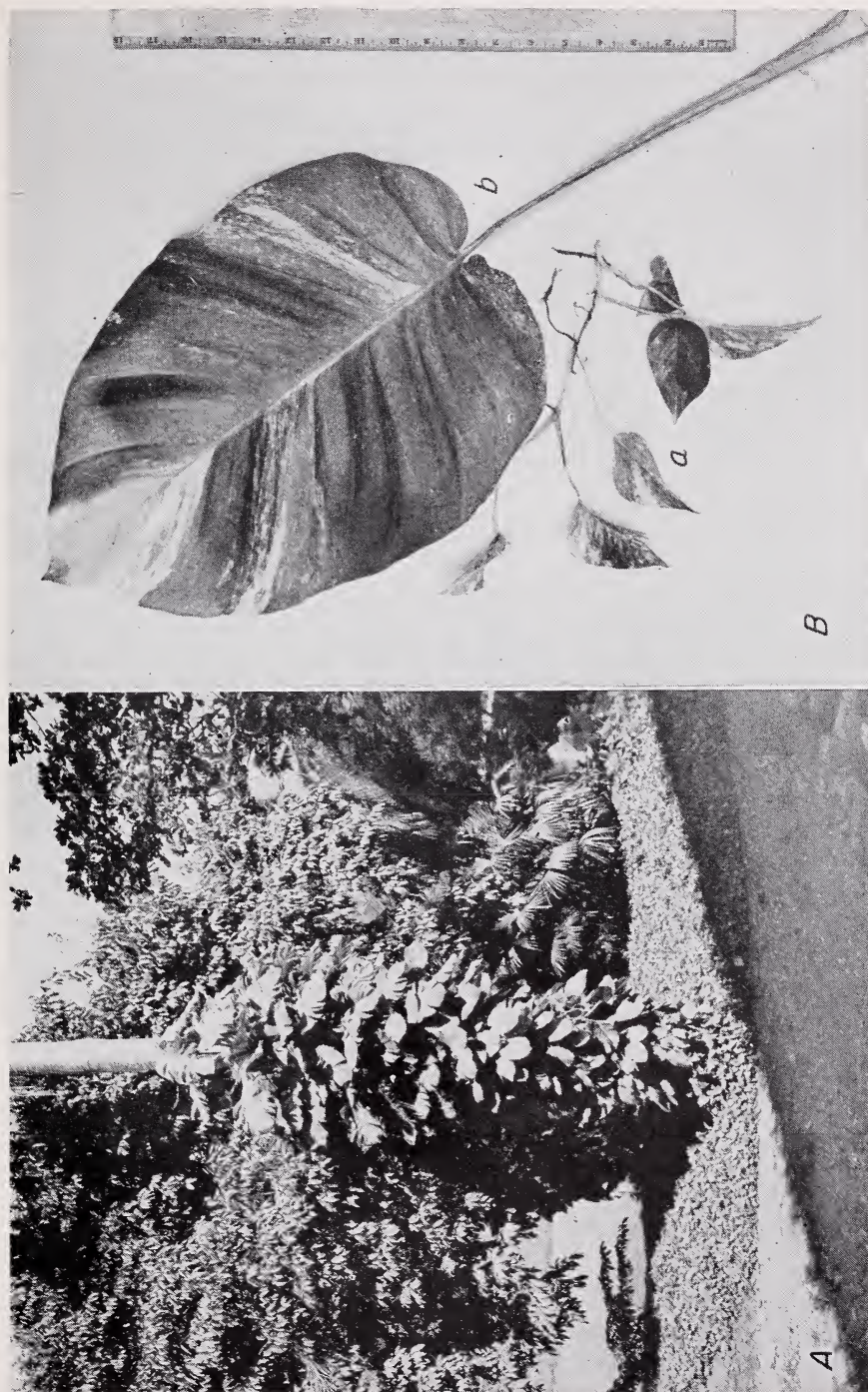


FIGURE 33.—4, The *Scindapsus (Pothos) aureus* on the ground has small, slender, pointed leaves, but when the vine climbs, the leaves become gradually larger. *B*, A close-up of the leaves: *a*, As a ground cover; *b*, nearly full size but not dissected as at full maturity.

grower and can be used for ornamental purposes at the same time. Its vigorous nature makes it suitable for screening, particularly of large areas such as barns. During the dry season the plant dies back to the ground unless watered, but renews growth with the beginning of the rainy season. It is tolerant of full sun and grows well in partial shade.

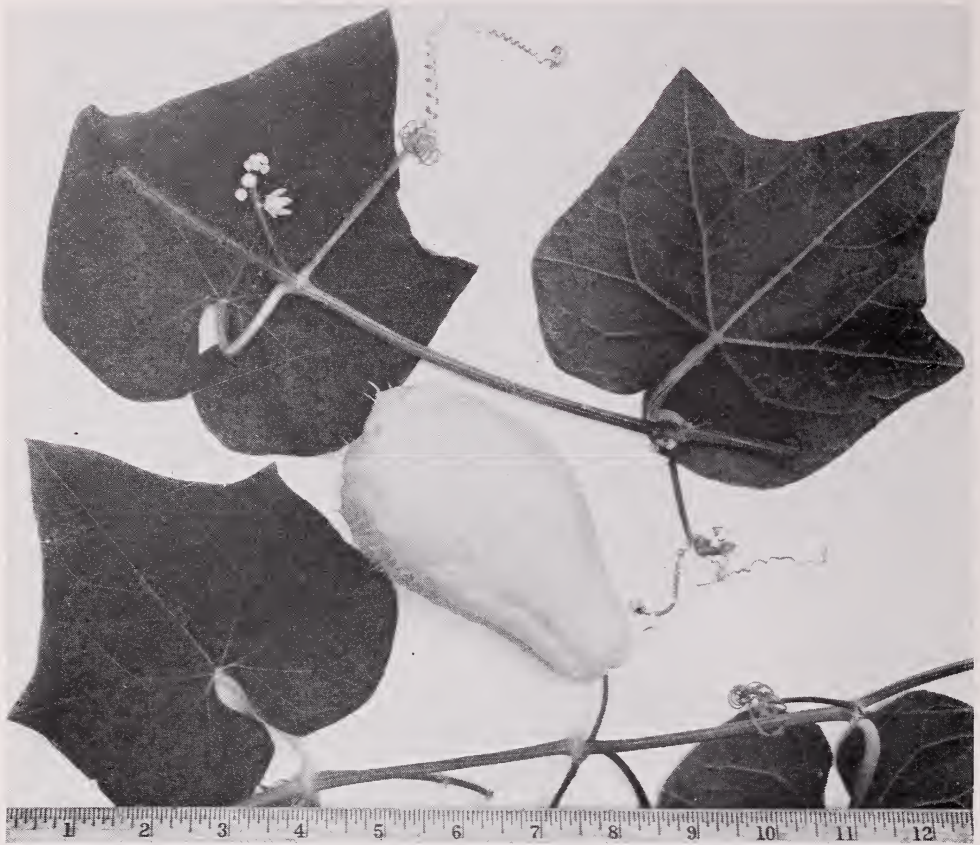


FIGURE 34.—The chayote (*Sechium edule*) is a vigorous grower and a source of food.

The male orange flowers are produced along short flower stems 2 to 4 inches long, and the female flowers form directly on the stem; both types being produced at almost every node. The fruits are variable in size and shape, ranging from a few ounces to over a pound and usually somewhere between the shape of a cucumber and a pear. Both green and creamy white varieties are grown. The leaves resemble those of a squash or pumpkin, and have fine hairs, particularly along the lower surface near the veins. The plant climbs by branched tendrils.

Propagation is from fleshy roots or seeds.

Securidaca diversifolia (L.) Blake (P. I. No. 99633)

Synonyms: *S. erecta* Jacq., *Elsota diversifolia* (L.) Blake
Easterflower *Securidaca* (fig. 35)

This native of central and northern South America is also found naturally in some West Indian islands. It was obtained in 1939 for trial at the station at Mayagüez, where it has made vigorous growth. The chief flowering period is only about 1 month, usually in February, which is considered earlier than the common name would indicate, but sometimes flowers are also produced later in the year.

The small, lavender-pink flowers are produced in terminal clusters 3 to 5 inches long and make quite a show during the flowering period.



FIGURE 35.—*Securidaca diversifolia* produces lavender-pink flowers in the spring (A), followed by winged fruits (B).

The seeds mature in late April. They resemble the maple seed because of a large wing, 1 inch by $\frac{3}{8}$ inch, four times the length of the seed proper. The alternate leaves vary in shape from nearly circular to long and pointed. They are 1 to 5 inches long and have very short leaf stems.

The vine is grown from seeds.

Senecio confusus Britten
Mexican Daisy

"Margarita," "Orgullo de Mayagüez," "Senecio" (fig. 36)

This vine has been in the station collection since 1937. Its brilliant flower and easy culture have resulted in a widespread distribution



FIGURE 36.—A fast-growing orange-red-flowered vine for sunny locations is the Mexican daisy, *Senecio confusus*, which flowers most of the year.

throughout the island of Puerto Rico. It will serve as a ground cover or climb if the stem can encircle available supports. The flowers are produced in profusion the year round, making a colorful display. However, its vigorous nature will tend to smother slower growing plants unless frequently pruned.

The flowers appear in clusters at the tips of the stems and in the axils of the upper leaves. The petal-like parts are a brilliant orange. The central section is a yellow orange. The heads are 1 to $1\frac{1}{2}$ inches in diameter. Seeds are white and feathery and can be obtained from the dried heads. The leaves are alternate and have fine teeth along the margins of the 2- to 3-inch leaf blade, which terminate in a slender tip.

The plant is usually propagated from seed; and the stems may also be layered.

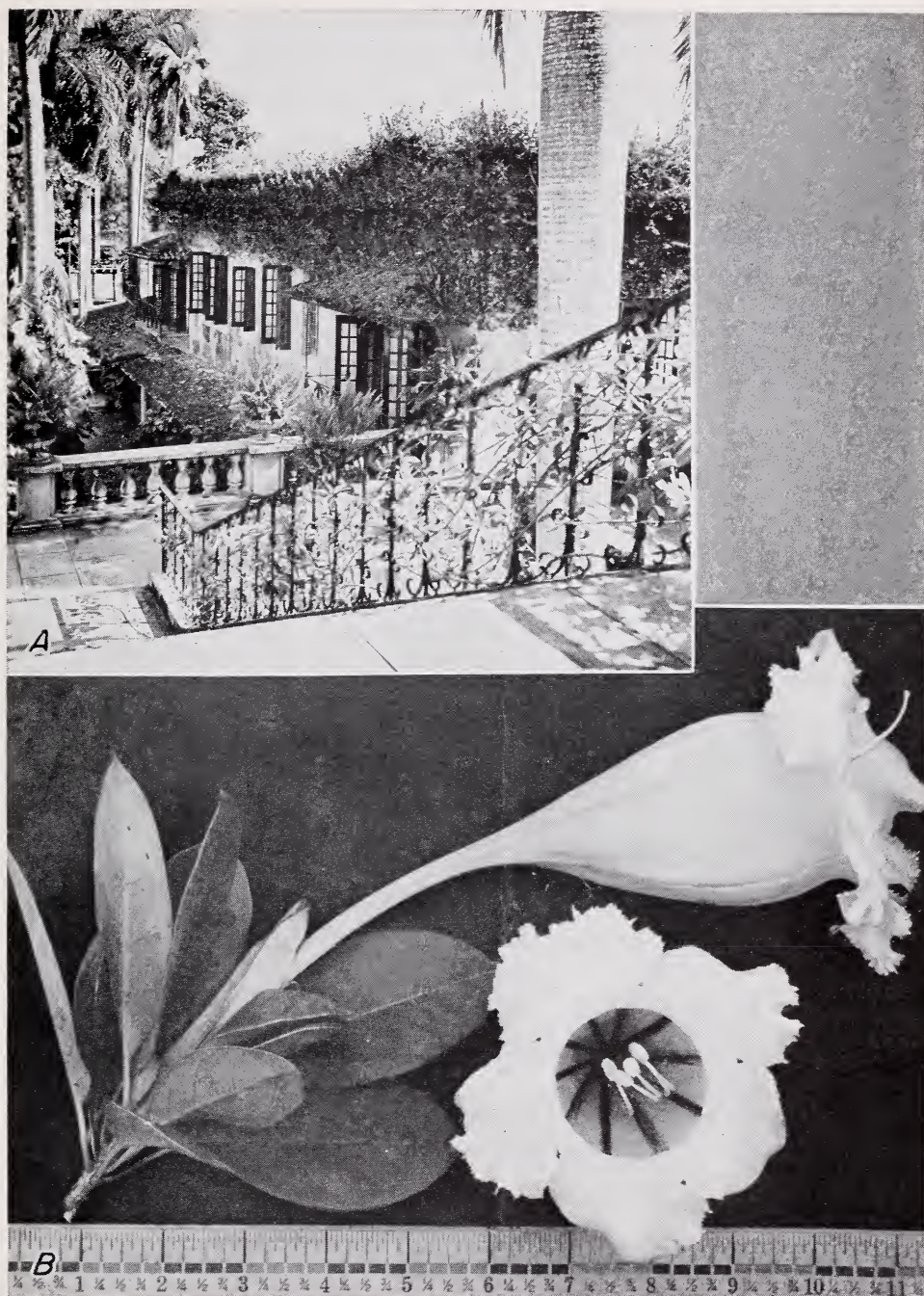


FIGURE 37.—*Solandra grandiflora* is useful on ballustrades (A) or wherever intermittent support is available. The flowers (B) open rapidly from well-developed buds in the evening.

Solandra grandiflora Swartz
Showy Chalice-vine (fig. 37)

Occasionally seen in Puerto Rican gardens is the showy chalice-vine. It has grown fairly well since 1936 in the station collection but apparently suffers from the dry periods during winter at this locality.

particularly when the roots have to compete with other plants for water.

In a lawn the leaves fall and the plant goes dormant instead of flowering in the winter. It grows to considerable height but the leaves are small and are usually clustered near the ends of the branches and, therefore, are poorly adapted for screening.

The lily-shaped flowers are large and creamy white outside. The interior of the cup is a light golden color. They open toward evening,



FIGURE 38.—*Solanum wendlandii* has large clusters of pale lilac-blue flowers.

changing from buds to fully opened flowers within a few minutes. Each one lasts several days. The color gradually darkens. Seeds have seldom developed at Mayagüez. They are produced in a globose pulpy berry. The shiny 4- to 6-inch leaves have a short tip in the middle of a rounded point.

In the absence of seeds, propagation is by cuttings.

Solanum wendlandii Hook. f.

Costa Rican Nightshade

"Campana de Pascua," "Flora de la Mañana," "Papa Aérea" (fig. 38)

This South American member of the potato family is occasionally grown throughout Puerto Rico from sea level to elevations of at least 2,500 feet. It does not appear particularly sensitive to soil conditions. Climbing by twisting the stems, it can reach well up into any supporting structure. Because of the tendency for growing upward it is not satisfactory for screening purposes.

The 1-inch-diameter flowers are light blue, star-shaped, and in clusters on flower stalks which are produced at the ends of the branches. Flowering is fairly continuous throughout the year as new flowers are continually being produced at the tips of the flower clusters. The

leaves are medium green on leafstalks sometimes armed with scattered prickles. The leaf form is variable depending on the amount of dissection. Young leaves and, in some strains, even the mature leaves, have no breaks in the leaf margins.

Seed are seldom produced but cuttings root readily.

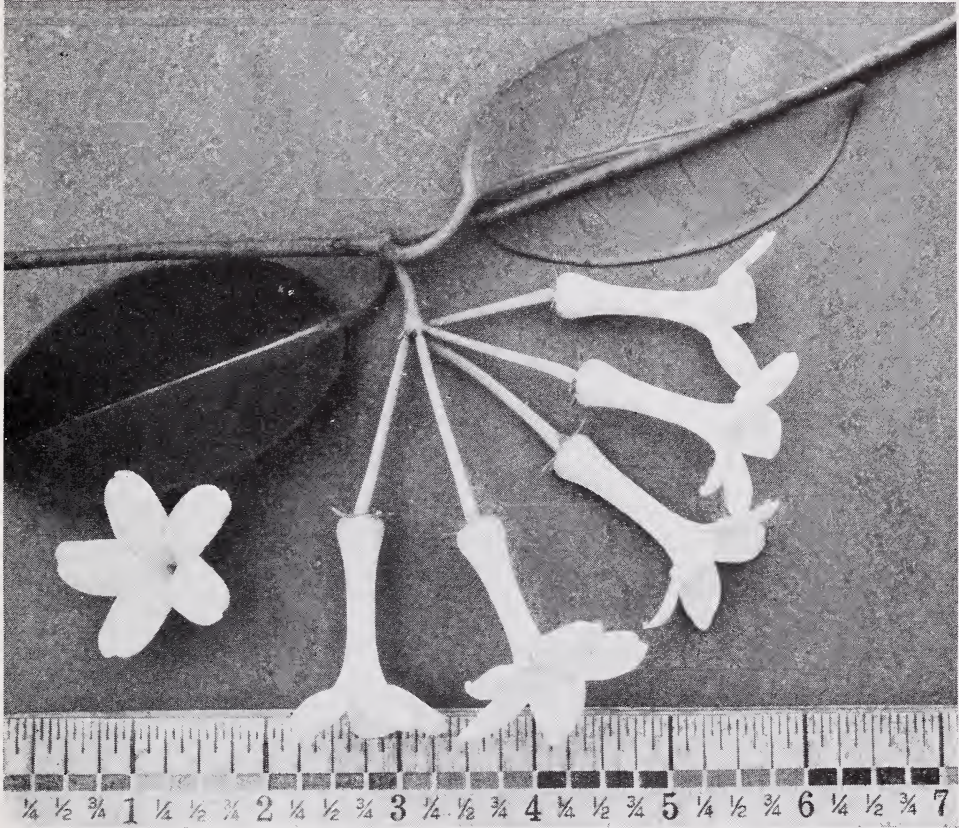


FIGURE 39.—The *Stephanotis floribunda* has waxy white flowers and shiny leaves.

***Stephanotis floribunda* Brongn.**
Madagascar Stephanotis
"Estefanota" (fig. 39)

The Madagascar stephanotis is occasionally found in Puerto Rican gardens, where it is grown primarily for its fragrant, waxy white flowers. It is rather rare because of its difficult culture during the early stages of growth. The stems are capable of climbing to considerable height, if supported, by twisting the stem; but it is not a rapid grower. It is useful for intermittent screening of porches, pergolas, and the like. The flowers last fairly well in water after cutting.

The flowers are produced in clusters of 5 to 8 on short stalks at the nodes. They are 1 to 2 inches long and waxy white. The seeds, each with a tuft of fine hair, are produced in 3- to 4-inch fleshy pods. The opposite leaves are shiny, waxy green above, and light green below and tipped by a short point. They are 4 inches long, including a 1-inch leaf stem.



FIGURE 40.—The ends of the petals in *Strophanthus sarmentosa* are tapered to very long thin tails.

Cuttings are difficult to root so seeds are preferred if available. The young plants should be free of weed competition and should not be deeply cultivated or permitted to dry out as they are not sturdy in the early stages.

Strophanthus sarmentosa DC.
Arrowpoison *Strophanthus* (fig. 40)

The Atkins Institution of the Arnold Arboretum sent some seed of the arrowpoison strophanthus to the Federal Experiment Station at Mayagüez in 1937. The resulting plants have grown fairly well even under severe competition. The plant is useful chiefly as an oddity as it has not grown vigorously enough to serve as a screen. This plant and several closely related species were extensively used for arrow poison. The drug can be extracted and used for certain heart troubles under the name strophanthin. The tendency to grow at the top makes it difficult to avoid bare lower branches. Flowering occurs chiefly in the spring. There is never enough bloom to create a massed color display, but the flowers form an attractive pattern against the dark-green foliage.

The flowers are formed in clusters close to the stems on very short flower stalks but only one or two flowers of a cluster ever open together. The bud is 4 inches long and has a long slender point shaped like a needle, from which the tapering petal tails unfold. The slightly scented flowers have a bluish-red throat with a double spur above each petal. The petal tails fade to pinkish white. Fruits are never produced under our conditions, perhaps because of the absence of suitable pollinating insects. The leaves are opposite, dark shiny green with prominent veins on the lower side, reaching 3 to 4 inches in length on short leaf stems. They resemble those of *Adenocalymna*, which also curve upward from the sides of the midrib and the slender tips curve downward. Tendrils are occasionally formed, quickly dropping as new leaves are formed above.

This vine is usually propagated by cuttings.

This plant contains a strong poison which will kill even large animals if sufficient juice gets into the blood stream. It should be used with considerable caution.

Syngonium auritum (L.) Schott (fig. 41)

This native of Hispaniola and Jamaica is occasionally planted in the U. S. Virgin Islands, from where it was introduced by the station in 1934. It is a high-climbing vine when a support such as a tree trunk is available. It is adapted to partially shaded conditions, but the range in light intensity for favorable growth is not known. Under Mayagüez conditions the plant is a slow grower, but the shiny, handsome foliage justifies its use under certain conditions. No flowers have been produced so far.

The leaves are compound with leaflets very unequal in size and spreading like the fingers of the hand, which vary in number from three to seven and are smaller toward the base. The leaf stems reach 18



FIGURE 41.—This slow-growing vine (*Syngonium auritum*) does best with partial shade.

inches, clasping the stem at the base with winglike ridges which extend most of the way to the leaflets. The stem contains a milky juice and produces aerial roots at every joint to hold the stem to the supporting surface.

Propagation is relatively easy by stem cuttings.

Tecomaria capensis (Thunb.) Spach
Cape-honeysuckle
"Jazmín Trompeta," "Tecoma" (fig. 42)

A woody climber from South Africa is the Cape-honeysuckle, which is commonly grown in the extreme southern sections of continental United States. At Mayagüez this plant has grown fairly well near sea level. It appears adaptable to considerable elevation. The vines climb readily on trellises or similar support. It is grown chiefly for the orange-red, slender, tubular flowers that are produced in clusters at the ends of the stems during late summer and fall.

The opposite leaves are compound, consisting of a central stem and seven to nine leaflets. The margins of the leaflets are slightly cut like the teeth of a saw.

This plant may be propagated fairly readily from cuttings or layers if seeds are not produced.

Thunbergia alata Bojer
Blackeyed Clockvine
"Culo de Poeta," "Susana" (fig. 43, A)

The blackeyed clockvine is well established throughout the island along fences and over low thickets. It is useful in small-sized areas because of the delicate texture of the numerous small leaves and buds. It flowers abundantly during the rainy season.

The flowers are carried on individual stalks $1\frac{1}{2}$ to 2 inches long in the axils of every leaf. They are orange with a deep-maroon throat or eye. The base is covered by two leaflike bracts, which remain long after the flowers drop, shriveling with the maturity of the seed. The pod is $\frac{3}{4}$ inch long with a swollen base, a slender flattened tip, and a whorl of 10 scalelike persistent sepals at the base. The leaves are soft and dark green, and are densely covered with very fine hairs that are not easily seen but give a satiny feeling to the touch. The leaf shape is roughly like an arrowhead 1 to 2 inches long with a minute point at each corner of the triangle. The leaf stems are winged by extensions of the leaf blade almost to the stem.

The vines are propagated from seed.



FIGURE 42.—*Tecomaria capensis*, or Cape-honeysuckle, produces orange flower clusters.

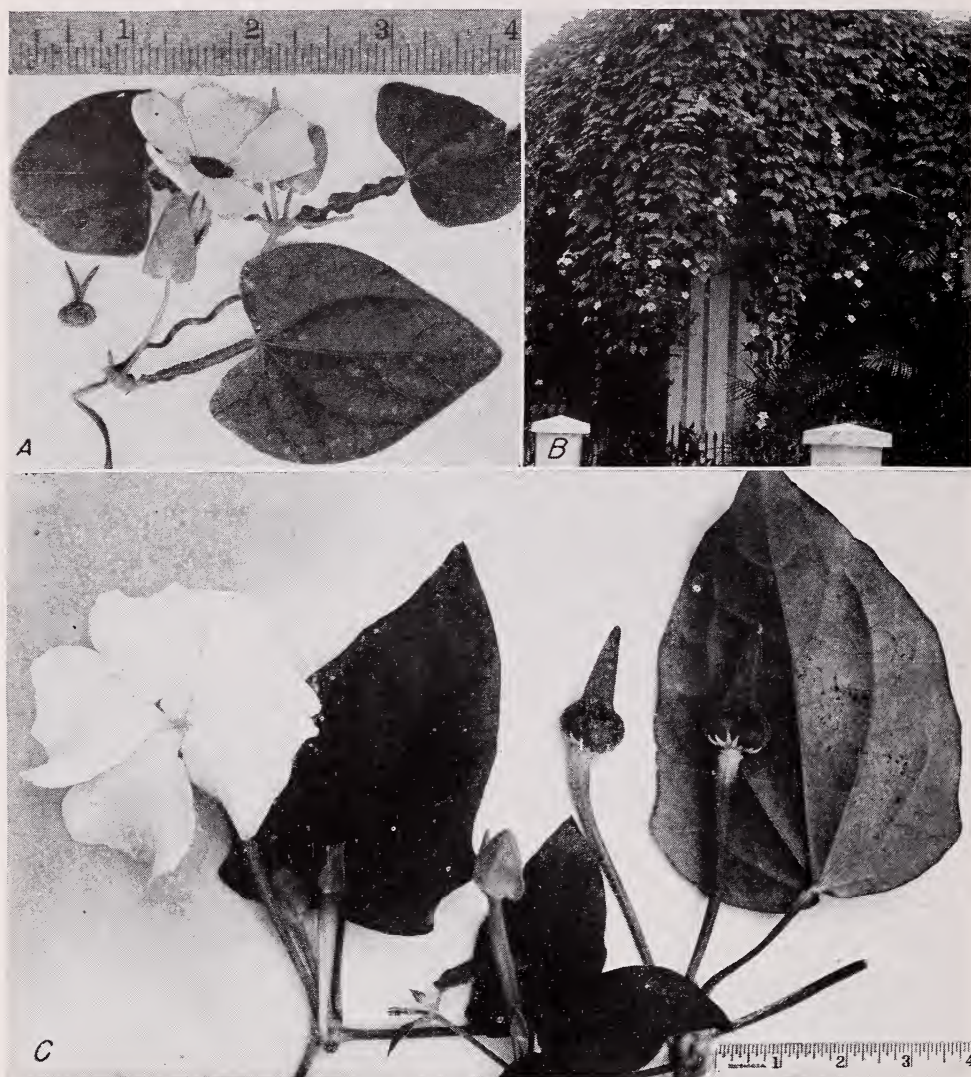


FIGURE 43.—Several thunbergias are ornamental vines of merit because of their profuse flowering habit. (A), *Thunbergia alata* grows naturally along roadsides. The seed pod at the left center splits through the pointed top when mature. (B), *T. grandiflora* produces many large blue flowers if the soil is fertile and well-drained. (C), *T. fragrans* is easily naturalized, but is not as prolific a bloomer.

Thunbergia fragrans Roxb.
Sweet Clockvine
"Enredadera," "Susana Blanca" (fig. 43, C)

The introduction of this vine to Puerto Rico probably occurred many years ago as it is now commonly found growing wild. It seldom climbs high or forms a cover. The delicate white flowers appear throughout the year but not in sufficient quantities to form a mass of color. It can be used for porch screening where a heavier foliage type would obscure a view or stop a breeze. The tendency to run necessitates regular but not too frequent pruning to keep it off other shrubs and flowers.

The flowers have a very slender tube with prominent flaring petals $1\frac{1}{2}$ to 2 inches in diameter. The leaves when young are narrow with almost smooth margins. Older leaves are 3 inches long and 2 inches wide with irregular curves in the margins. The leaf stems curl around any available supports to permit climbing. Seeds are frequently produced in a pointed capsule which splits from the base when mature, throwing out the seeds.

Propagation is from seeds gathered just before the capsules mature.

Thunbergia grandiflora Roxb.
Bengal Clockvine
"Fausto," "Pompeya" (fig. 43, B)

This vine can supply a profusion of beautiful sky-blue flowers on a fence or trellis, backed by dense dark green foliage. It is moderately vigorous but sensitive to poor growth conditions as indicated by reduced flower production. The flowers cannot be cut for decorations as they wilt within a few minutes.

The blue color of the petals contrasts well with the white in the cuplike center, making a pleasing combination. The leaves are dark green but not shiny. They have pointed tips and margins that become more irregular as the leaves get older. The plant climbs by twining the leaf around any available support. It is somewhat susceptible to leaf-chewing insects.

The plant is propagated by cuttings taken from hard or semihardwood.

Uvaria lancifolia Merr. (fig. 44)

At the station at Mayagüez the plants of *Uvaria lancifolia* have made vigorous growth since their introduction from the Philippines in



FIGURE 44.—*Uvaria lancifolia* is a vigorous woody climber with red flowers and red grapelike clusters of fruit.

1929. The vine has not become generally distributed because its large size and spreading character limit its usefulness to large areas. Unsupported, it easily grows into a shrub. The fruit is edible but not particularly desirable, except for preserves, because of a high proportion of seeds.

The flowers are produced on short flower stems on the lower side of the branches, which partially obscure them. The petals are a deep rusty red and vary from 5 to 7 in number. The flower is slightly more than 1 inch in diameter. The central "eye" changes from brown to gray. It consists of about 50 "units." Some of these swell into the cluster of red fruits shaped like a large capsule 1 to 3 inches long and about one-half as thick. The flowers are formed from April to June. The fruit matures during July and August. The alternate leaves vary in shape. The larger ones have wavy or even indented margins with blunt tips and lobes at the base on either side of the leaf stem. The smaller ones have smooth margins, slender points, and little lobbing at the base. The lower surface and young branches are covered with short, fine, brown or gray hairs.

Seeds are used for propagation.

Vanilla
Vanilla (fig. 45)

There are several species of *Vanilla* such as *V. planifolia* Andr., and *V. phaeantha* Reichb. f. which can be adapted to landscape use. Generally speaking, they are somewhat difficult to grow and do not make as attractive an appearance as many of the other vines listed. However, they are orchids, a little unusual, and appealing. The vines must be grown in partial, but not heavy shade as full sunlight even for short periods has an unfavorable effect on the plants and excessive shade results in slow, weak growth.

The plant has to grow usually 3 years before regular flowering begins. The greenish-yellow flowers are normally produced from November to May in the axils of leaves on horizontal or hanging stems. The small size, 2 to 3 inches, and short life of the flowers preclude any mass of color. Pods normally are formed only after hand-pollination and require 8 months to mature. They must undergo a detailed processing before becoming suitable for flavoring. Vanilla roots live chiefly in the decaying vegetable matter on the surface of the soil. A thick mulch helps to maintain vigorous root action. During dry periods, particularly as the pods are forming, regular watering is very desirable, but good drainage is also essential. The leaves are thick dark green, 5 to 8 inches long, with parallel margins for most of the length and without definite leaf stem. The stems zigzag away from each leaf when in contact with a tree trunk but are nearly straight when unsupported.

The vines are propagated by long stem cuttings 3 to 4 feet long, half buried in mulch at their permanent location.

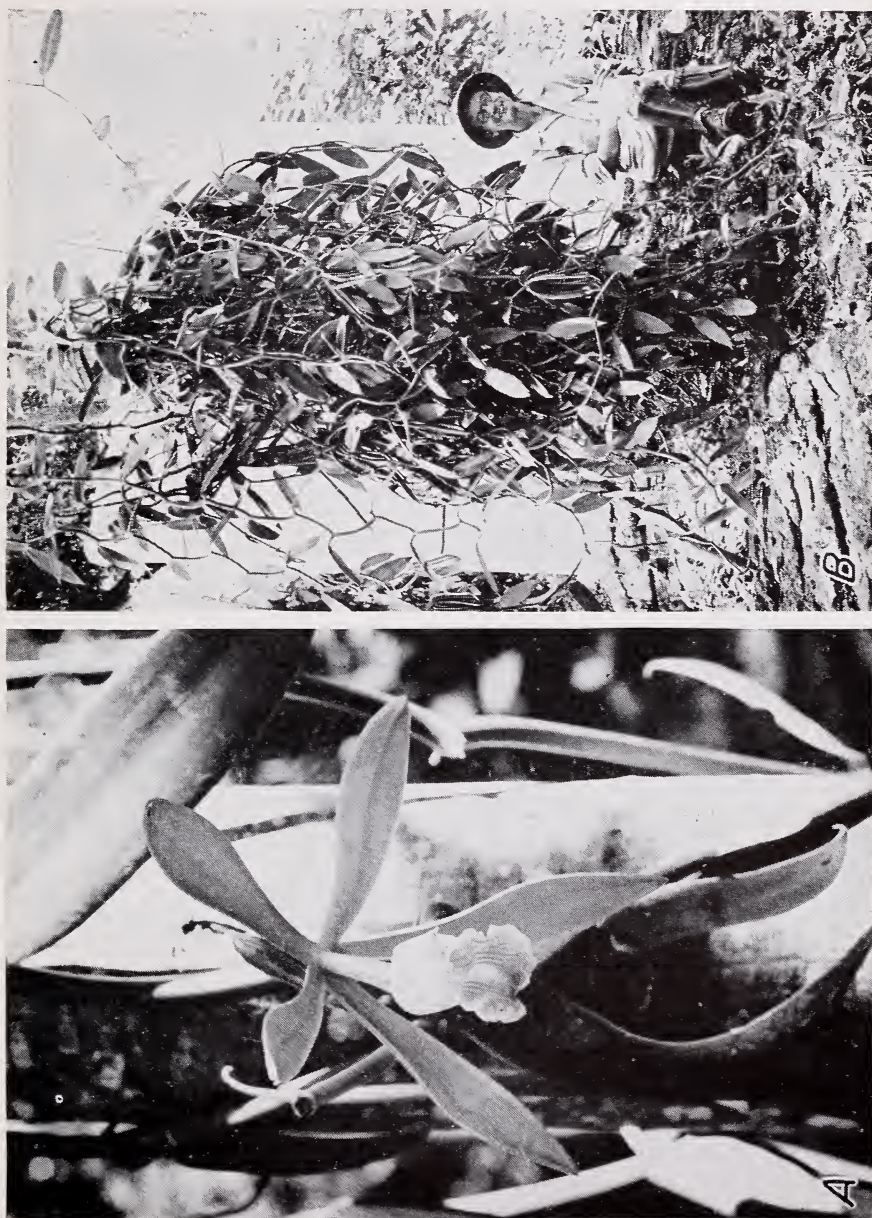


FIGURE 45.—Vanilla vines do not produce as large and colorful flowers as many orchids. The flower (A) remains open only half a day and must be pollinated to set seed. B, *Vanilla planifolia* grown as a source of flavoring.

A KEY FOR IDENTIFYING THE VINES DESCRIBED IN THIS CIRCULAR¹

- A Stem large and fleshy, tree climbing or ground covers, flowers seldom seen, usually white, fruits usually dark green.
Climbs by numerous aerial roots.
(See also *Vanilla* and *Hylocereus*.)
 - B Leaves a uniform green.
 - C Small leaves entire, large leaves separating near the base of the leaf blade into 3 to 7 leaflets.
 - D Leaves shiny, waxy, the leaflets with little or no separate stems-----SYNGONIUM AURITUM
 - DD Leaves 3-, 5-, or 7-branched with separate leaflet stems and wavy margins-----NEPHTHYTIS AFZELII
 - CC Leaves entire or deeply cut toward the midvein.
 - D Leaves very large, deeply cut, with frequent perforations.
MONSTERA DELICIOSA
 - DD Leaves seldom perforated.
 - E Leaves large, triangular, seldom cut.
PHILODENDRON GIGANTEUM
 - EE Leaves deeply cut, sharply pointed sections.
PHILODENDRON DUBIUM
 - BB Leaves not uniform green.
 - C Margins, leaf sheaths, and flower cover deep red.
PHILODENDRON ERUBESCENS
 - CC Leaves not red.
 - D Yellow streaks parallel to the veins-----SCINDAPSUS AUREUS
 - DD Parallel rows of white dots along the midvein on upper surface.
PHILODENDRON NECHODOMI
- AA Stems not large and fleshy.
 - B Seldom-flowering vines grown chiefly for the handsome foliage.
 - C Leaves compound, the 2 side leaflets wider on the lower side.
CISSUS RHOMBIFOLIA
 - CC Leaves simple, dark, shiny, slender pointed-----PIPER
 - CCC Leaves many times branched, fine-textured-----ASPARAGUS PLUMOSUS
 - BB Vines grown chiefly for their flower.
 - C Leaves compound (leaves divided into 2 or more leaflets).
 - D Leaves opposite (the whole leaf, not the individual leaflets).
 - E Tendrils absent.
 - F Flowers orange red-----TECOMARIA CAPENSIS
 - FF Flowers white (yellow in some, not described).
JASMINUM
 - EE Tendril simple, unbranched.
 - F Flowers at the end of leafy branches or side branches.
 - G Flower blue and white, tendrils long and thin.
ADENOCALYMNA ALLIACEUM
 - GG Flowers pink with purple veins, tendrils woody.
CYDISTA AEQUINOCTIALIS
 - FF Flowers on shoots from the axils of old leaves.
ARRABIDAEA PACHYCALYX
 - E Tendrils branched.
 - F Flowers yellow-----ANEMOPAEGMA CHAMBERLAYNII
 - FF Flowers red-----PYROSTEGIA IGNEA

¹ If the unknown vine fits the description under A, pass on to B, otherwise to the alternate AA, and so on with succeeding letters until the description fits the species or genus of the plant in question.

AA Stems not large and fleshy—Continued

C Leaves compound (leaves divided into 2 or more leaflets)—Continued

DD Leaves alternate.

E Leaves divided into 5 to 7 distinct leaflets—CLITORIA TERNATEA

EE Leaves irregularly cut to the midrib-----SOLANUM

CC Leaves simple (not divided into leaflets).

D Leaves opposite.

E One to three flowers open at a time on each flower stem.

F Flowers small, having a slender tubular base.

G Flowers formed in pairs-----LONICERA JAPONICA

GG Flowers formed singly, calyx persistent.

THUNBERGIA

FF Flowers intermediate in size, tube short if present.

G Flowers lavender blue, milky sap----CRYPTOSTEGIA

GG Flowers pink with long tapering petals.

STROPHANTHUS

FFF Flowers large, lily shaped-----BEAUMONTIA

EE Flowers on flower stems of 5 to 60.

F Flowers confined to specialized stalks near the ends of branches.

G Flower clusters with three conspicuous lavender-pink bracts-----CONGEA TOMENTOSA

GG Flowers bright red or white, small sized, numerous.

COMBRETUM

FF Flowers in clusters at tips of side branches.

G Tubes slender, 1 inch or longer.

H Flowers white, sometimes fragrant--JASMINUM

HH Flowers opening white or pink, later deep red.

QUISQUALIS

GG Tubes short, less than 1 inch.

H Flowers blue lavender (also white variety).

PETREA

HH Petals bright red, sepals white, persistent.

CLERODENDRON

DD Leaves alternate.

E Climbs by tendrils.

F Tendrils unbranched-----PASSIFLORA

FF Tendrils branched.

G Flowers pink or white, delicate textures.

ANTIGONON

GG Flowers inconspicuous, yellow, fruit white or green.

SECHIMUM

EE Climbs by spines, color various, chiefly in bracts.

BOUGAINVILLEA

EEE Climbs by curling branch tips around supports----BAUHINIA

EEEE Climbs by holdfasts or aerial roots.

F Holdfasts common chiefly on immature stems----FICUS

FF Holdfasts secondary climbing chiefly by curling stems.

CALONYCTION

FFF Aerial roots produced at nodes-----VANILLA

EEEEEE No specialized means of climbing.

F Flowers in clusters at the ends of branches, or axils of youngest leaves.

G Flowers small, 1/2 inch or less.

H Flowers white, numerous, tubular----PORANA

HH Flowers lilac lavender-----SECURIDACA

G Flowers 1 inch or more in diameter.

H Flowers orange red, heads 1-1 1/2 in. in diameter.

SENECIO

HH Flowers blue, 1 inch in diameter----SOLANUM

- AA Stems not large and fleshy—Continued
 - CC Leaves simple (not divided into leaflets—Continued
 - DD Leaves alternate—Continued
 - EEEE No specialized means of climbing—Continued
 - GG Flowers reddish, formed on the underside of stems.
axillary branches.
 - G Flowers solitary, white, night blooming.
 - GG Flowers reddish, formed on the underside of stems
 - UVARIA
 - GGG Flowers mottled, maroon and white---ARISTOLOCHIA
 - GGGG Flowers white to light gold, large, cup-shaped.
 - SOLANDRA
- DDD Leaves whorled.
 - E Flowers yellow-----ALLAMANDA
 - EE Flowers white or red-----COMBRETUM
 - DDDD Leaves absent-----HYLOCEREUS

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